NEC

PART NO. 599910501

SERVICE MANUAL

COLOR MONITOR **MultiSync® FP1370**

MODELS FP1370 (A) / (B)

NEC Corporation

200002
08109341
08109342

WARNING

The SERVICE PERSONNEL should have the appropriate technical training, knowledge and experience necessary to:

- Be familiar with specialized test equipment, and
- Be careful to follow all safety procedures associated with high voltage CRT circuit designs to minimize danger to themselves and their coworkers.

To avoid electrical shocks, this equipment should be used with an appropriate power code and be connected only to a properly grounded AC outlet.

This equipment utilized a micro-gap power switch. Turn off the set by first pushing the front panel power switch. Next, remove the power cord from the AC outlet.

To prevent fire or shock hazards, do not expose this unit to rain or moisture.

This symbol warns the personnel that un-insulated voltage within the unit may have sufficient magnitude to cause electric shock.

This symbol alerts the personnel that important literature concerning the operation and maintenance of this unit has been included.
Therefore, it should be read carefully in order to avoid any problems.

PRODUCT SAFETY CAUTION

1. When parts replacement is required for servicing, always use the manufacturer's specified replacement.
2. Comply with all caution and safety-related notes on the product display chassis and picture tube.
3. When replacing the component, always be certain that all the components are put back in the place.
4. When servicing display monitor unit, it is required that the provided lead dress is used in the high voltage circuit area.
5. It is also recommended that shatter proof goggles are worn, when removing installing and handling the picture tube. People not equipped with the proper precautionary measures mentioned should keep the picture tube away from body while handling.
6. As for a connector, pick and extract housing with fingers properly since a disconnection and improper contacts may occur, when wires of the connector are led.
7. Use a proper screwdriver. If you use screwdriver that does not fit, you may damage the screws.
8. X-radiation precaution

   This product contains critical electrical and mechanical parts essential for X-ray protection.

   Normal anode voltage is 27.0 kV at zero beam picture tube current under AC 100-120V/220-240V input, and anode voltage must not exceed the voltages shown below under any operation condition.

   To measure anode voltage set brightness for very dim picture, and use a high impedance volt meter between chassis and anode lead and measure high voltage.

   If high voltage exceeds the specifications on the chassis schematic diagram, take the necessary corrective action.

Table MAXIMUM ANODE VOLTAGE

beam current	at 0 mA	at 0.8 mA	at 1.4 mA
A/B	34.5 kV	32.5 kV	32.3 kV

9. When you degauss the set with an external degaussing coil, you must keep strictly item " ※Notes about degaussing method " of ADJUSTMENT PROCEDURES.

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SPECIFICATIONS

Monitor Specifications	**MultiSync ® FP1370 ™ Monitor**	**Notes**
Picture Tube Diagonal: Viewable Image Size: Radius:	55.3 cm / 22 inch 50.8 cm / 20 inch 57800 mm	90° deflection, 0.24 mm grille pitch, Medium-Short persistence phosphor, aperture grille CRT, multi-layered, anti-static screen coating, semi-dark-tint screen, and OptiClear screen surface.
Input Signal Video: Sync:	ANALOG 0.7 Vp-p/75 Ohms Separate sync. TTL Level Horizontal sync. Positive/Negative Vertical sync. Positive/Negative Composite sync. (Positive/Negative) (TTL Level) Sync on Green video (Positive) 0.7 Vp-p and sync. (Negative) 0.3 Vp-p	
Display Colors Analog input:	Unlimited number of Colors	Depends on display card used.
Synchronization Horizontal: Range Vertical:	31 kHz to 130 kHz 55 Hz to 160 Hz	Automatically Automatically
Resolutions Supported Resolution based on horizontal and vertical frequencies only	640 x 480 @ 60 to 160 Hz 800 x 600 @ 55 to 160 Hz 832 x 624 @ 55 to 160 Hz 1024 x 768 @ 55 to 154 Hz 1152 x 870 @ 55 to 137 Hz 1280 x 1024 @ 55 to 118 Hz 1600 x 1200 @ 55 to 102Hz ….... 1792 x 1344 @ 55 to 91 Hz 1800 x 1440 @ 55 to 85 Hz 1856 x 1392 @ 55 to 88 Hz 1920 x 1440 @ 55 to 85 Hz 2048 x 1536 @ 55 to 80 Hz	Some systems may not support all modes listed. NEC cites recommended resolution at 85 Hz for optimal display performance
Active Display Area Horizontal: (Factory Setting) Vertical:	396 mm/15.6 inches 297 mm/11.7 inches	Dependent upon signal timing used, and does not include border area.
Active Display Area (Full Scan)	406 mm/16.0 inches 305 mm/12.0 inches	Dependent upon signal timing used, and does not include border area.
Power Supply	AC 100 - 120 V / 220 - 240 V, 50/60 Hz	
Current Rating	2.4A @ 100 - 120 V / 1.1A@ 220-240 V	
Dimensions	483 mm (W) x 501 mm (H) x 472 mm (D) 19.0 inches (W) x 19.7 inches (H) x 18.6 inches (D)	
Weight	32.4 kg 71.4 lbs	
Environmental Considerations Operating Temperature: Humidity: Altitude: Torage Temperature: Humidity: Altitude:	 10° C to + 35° C / + 50° F to + 90° F 30% to 80% 3,000 m / 10,000 Feet -20° C to + 60° C / + 4° F to + 140° F 10% to 90% 13,700 m / 45,000 Feet	

NOTE: Technical specifications are subject to change without notice.

CONTROLS

OSM™ (ON-Screen Manager) control buttons on the front of the monitor function as follows:

	Main Menu	**Sub-Menu**
EXIT	Exits the OSM menu.	Exits to the OSM controls main menu.
▲/▼	Moves the highlighted area up/down to select one of the controls.	Moves the highlighted area up/down to select one of the controls.
−/+	Moves the highlighted area left/right to select one of the controls.	Moves the bar in the - or + direction to decrease or increase the adjustment.
PROCEED	Has no function.	Only executes control or enters sub, sub-menu.
RESET	Resets all the controls within the highlighted menu to the factory setting.	Resets the highlighted control to the factory setting.

NOTE : When **RESET** is pressed in the main and sub-menu, a warning window will appear allowing you to cancel the reset function.

When OSM controls are activated, icons are displayed at the top of the menu.

If an arrow (→) is displayed in a sub-menu, it indicates further choices are available.

To enter a sub, sub-menu, press PROCEED.

Brightness/Contrast Controls

Brightness : Adjusts the overall image and background screen brightness.

Contrast : Adjusts the image brightness in relation to the background.

Degauss : Eliminates the buildup of stray magnetic fields which alter the correct scan of the electron beams and affect the purity of the screen colors, focus, and convergence. When activated, your screen image will jump and waver a bit as the screen is demagnetized.

Caution : Please allow a minimum of 20 minutes to elapse between uses of the Degauss Control.

Size and Position Controls

Auto Adjust : Automatically adjusts the horizontal and vertical size and position settings for applicable signal timings.

Left/Right : Moves the image horizontally (left or right).

Down/Up : Moves the image vertically (up or down).

Narrow/Wide : Decreases or increases the horizontal size of the image.

Short/Tall : Decreases or increases the vertical size of the image.

Color Control / AccuColor® Control System

Color Presets 1 through 5 selects the desired color setting. The bar is replaced by the color setting choice from 1 to 5. Each color setting is adjusted at the factory to the stated Kelvin. If a setting is adjusted, the name of the setting will change from Kelvin to Custom.

Red, Green, Blue : NEC's AccuColor Control System decreases or increases the monitor's red, green, or blue color guns depending upon which is selected. The change in color will appear on screen and the direction (decrease or increase) will be shown by the bars.

Geometry Controls

Geometry Controls Menu

The **Geometry** controls allow you to adjust the curvature or angle of the sides of your display.

Sides In/Out (pincushion): Decreases or increases the curvature of the sides either inward or outward.

Sides Left/Right (pincushion balance): Decreases or increases the curvature of the sides either to the left or right.

Sides Tilt (parallelogram) : Decreases or increases the tilt of the sides either to the left or right.

Sides Align (trapezoidal) : Decreases or increases the bottom of the screen to be the same as the top.

Rotate (raster rotation) : Rotates the entire display clockwise or counterclockwise.

Tools 1

Moiré Canceler: Moiré is a wavy pattern which can sometimes appear on the screen. The pattern is repetitive and superimposed as rippled images. When running certain applications, the wavy pattern is more evident than in others. To reduce moiré, adjust the ON/Level by using the –/+ CONTROL buttons.

Basic Convergence: Aligns all three colors(R,G,B) to form a single color(white). The purpose of this control is to ensure that a white line drawn on the screen is as crisp and clear as possible.

- Use the Horizontal control to adjust the alignment of the white lines in the up/down direction.
- Use the Vertical control to adjust the alignment of the white lines in the left/right direction.

Area Convergence: A small window will appear to indicate the area of adjustment - Top Horizontal, Top Vertical, Bottom Horizontal or Bottom Vertical.

Corner Correction: Allows you to adjust the geometry of the corners of your display - Top, Top Balance, Bottom or Bottom Balance.

Linearity: This selection allows you to adjust the spacing of the area on the screen. The purpose of this control is to ensure that a one-inch circle is a true one-inch circle wherever it is on the screen. The best way to determine the vertical linearity is as follows:

- Draw equally spaced horizontal lines using a drawing application that has a ruler.
- Use the Vertical Balance control to adjust the lines near the top and bottom of your screen.
- Use the Vertical control to adjust the spacing between the lines near the center and top of your screen.

GlobalSync® Control: Eliminates picture impurities that may result from the earth's magnetic field. While in the sub-menus(GlobalSync, Top Left, Top Right, Bottom Left or Bottom Right), use the -/+ control buttons to fine tune the GlobalSync corrections.

Note: NEC recommends that you perform GlobalSync correction while running a typical application such as a spreadsheet or text document.

Sharpness: Allows you to adjust the clarity of the image, based on the quality of the signal received from the computer.

- Use a full text document to make this adjustment.
- Cycle through the four sharpness settings and select the one that provides the sharpness focus and contrast of the text.

Factory Preset: Selecting Factory Preset allows you a reset most OSM™ control settings back to the factory settings. A warning statement will appear to confirm that you do want to reset ALL settings. Individual settings can be reset by highlighting the control to be reset and pressing the **RESET** button.

Tools 2

Language: OSM control menus are available in seven languages.

OSM Position: You can choose where you would like the OSM controls menu to appear on your screen. Selecting OSM Position allows you to manually adjust the OSM controls menu left, right, up or down.

OSM Turn Off: The OSM controls menu will stay on as long as it is in use. In the OSM Turn Off sub-menu, you can select how long the monitor waits after the last touch of a button for the OSM controls menu to disappear. The preset choices are 10, 20, 30, 60 and 120 seconds.

OSM Lock Out: This control completely locks out access to all OSM controls functions except Brightness and Contrast. When attempting to activate OSM controls while in the lock out mode, a screen will appear indicating that OSM controls are locked out. To activate the OSM Lock Out function, press **PROCEED**, then press ▲ and hold down simultaneously. To deactivate the OSM Lock Out, press **PROCEED**, then press ▲ and hold down simultaneously.

IPM™ System Off Mode: Enable: The IPM System works normally and all stages of energy savings are utilized.
Disable: The Off Mode of the IPM System is not used.

NOTE: For standard systems and graphics boards, keep the factory setting at ENABLE.

EdgeLock™ Control: Operating your monitor at a non-standard timing may cause images to appear darker than normal or have color distortion. Use of the EdgeLock control will adjust images to their normal state.

Refresh Notifier: A message will advise you if the refresh rate of the signal being applied to the monitor by the computer is too low. For further information, please refer to your display card or system manual.

Information

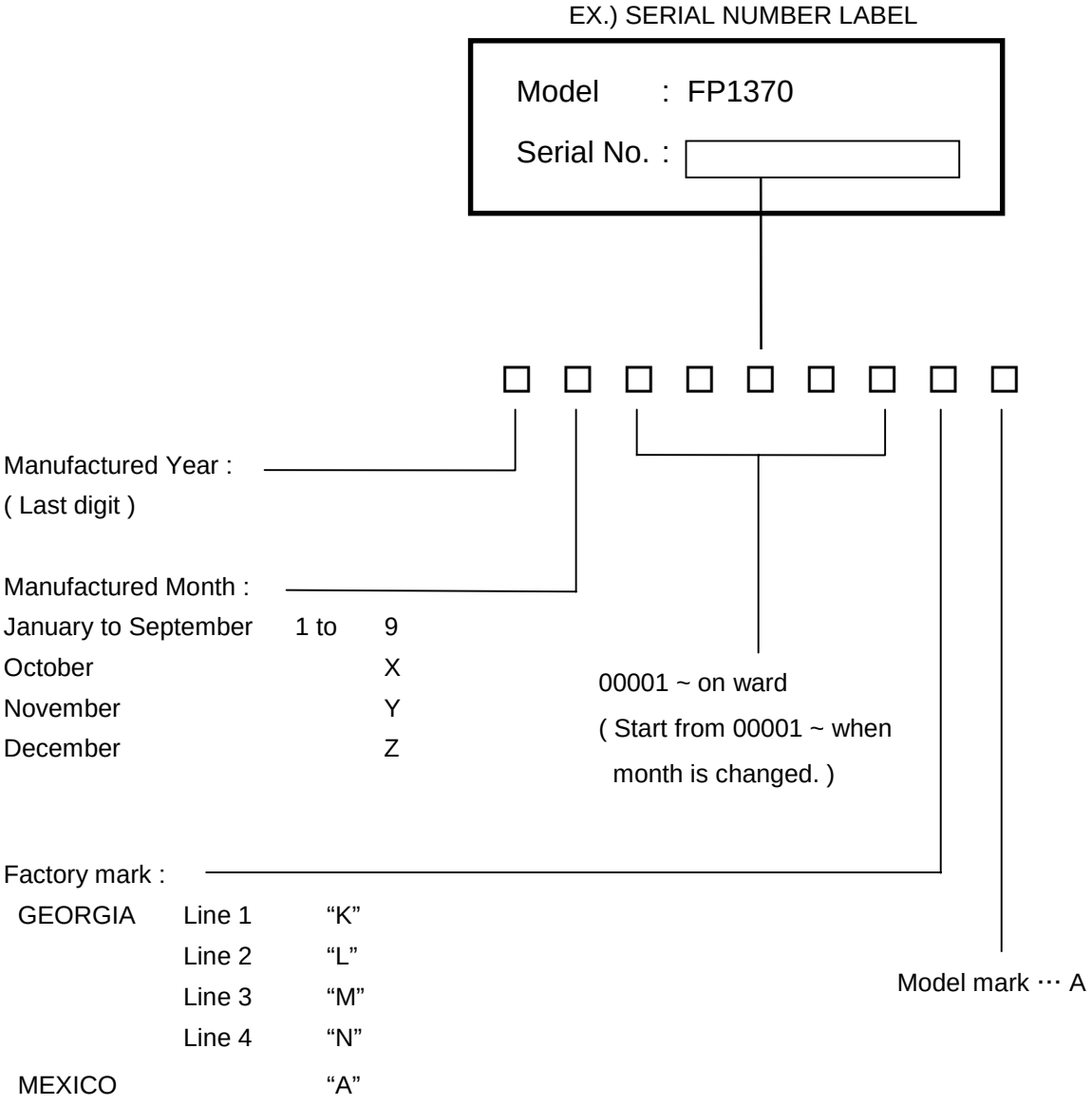
Display Mode: Indicates the current mode and frequency setting of the monitor.

Fitness Tips: The fitness Tips provide you with helpful reminders to periodically rest your eyes. You may select how frequently the remainders are displayed based upon your individual needs. Select an interval from 15,30,45,60,90 or 120 minutes for the tips to appear. When the tips appear, follow the advice of the tips and press EXIT to clear.

Monitor Info: Indicates the model and serial numbers of your monitor.

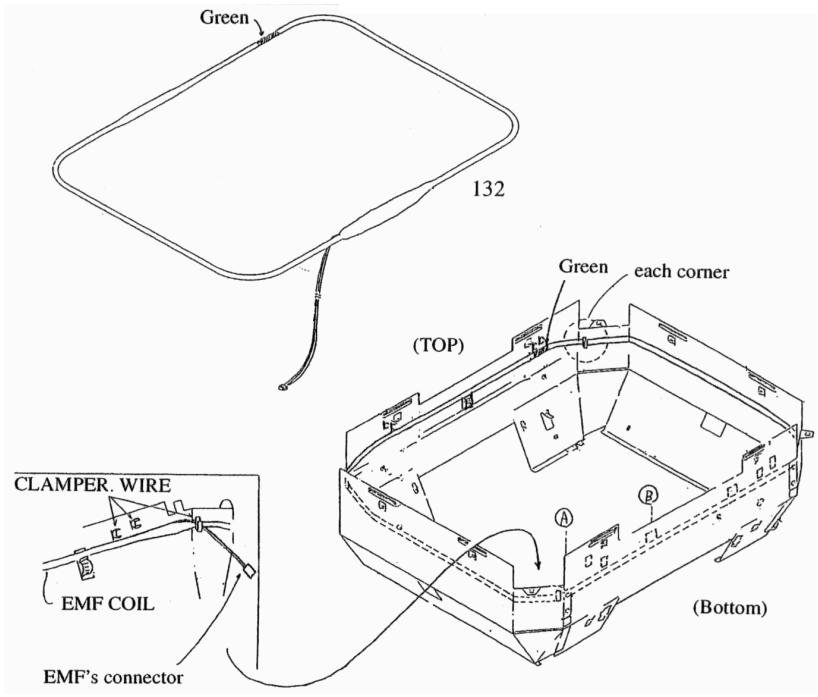
SERIAL NUMBER INFORMATION

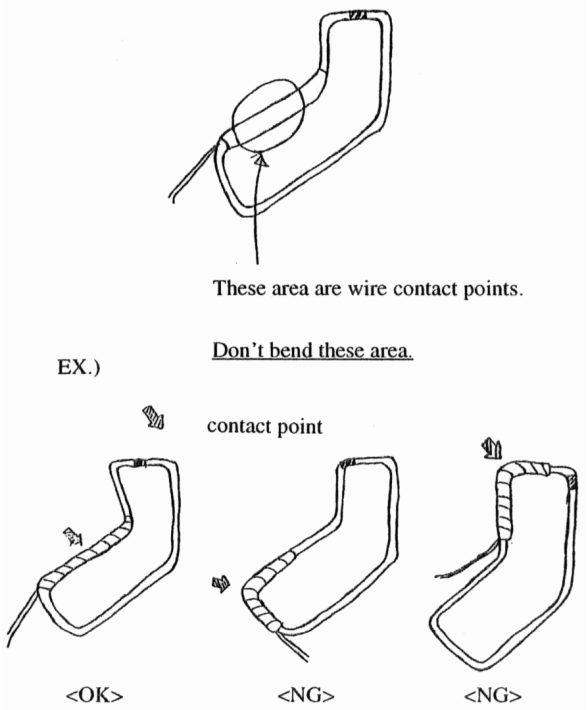
Refer to the serial number information shown below.

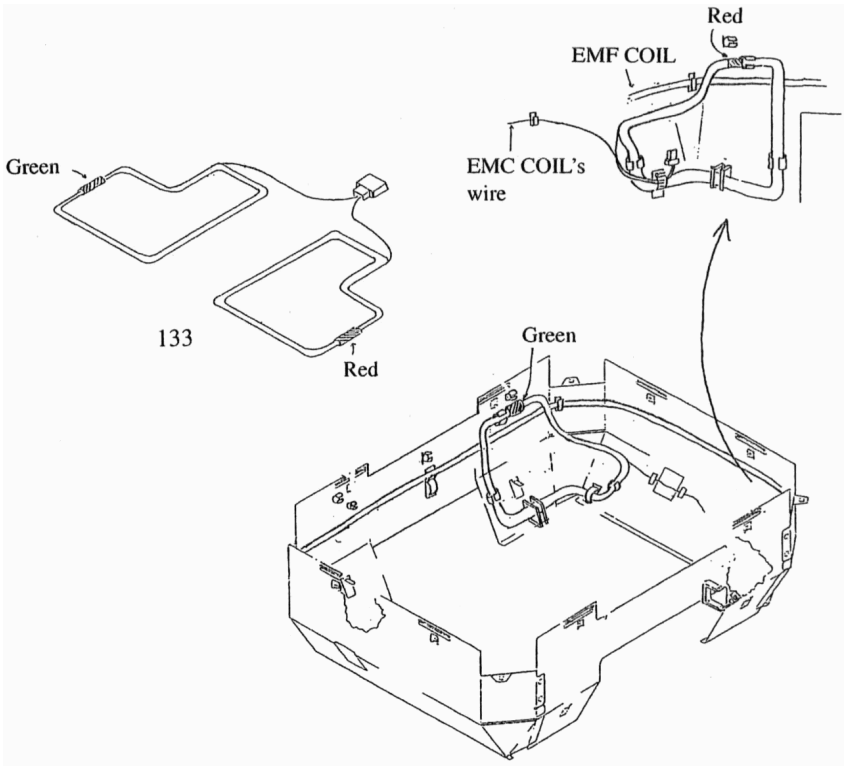


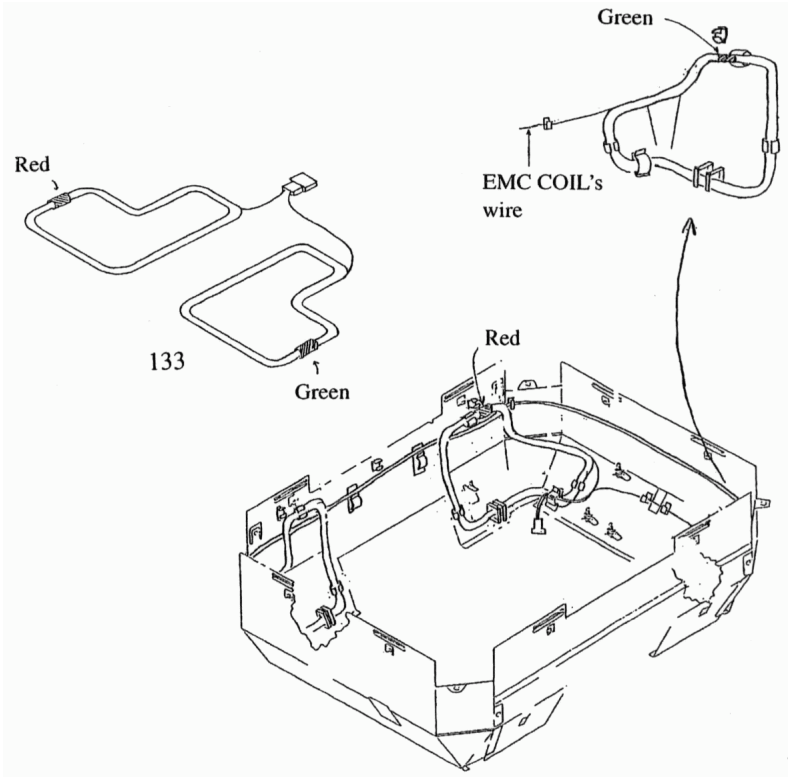
ASSEMBLY

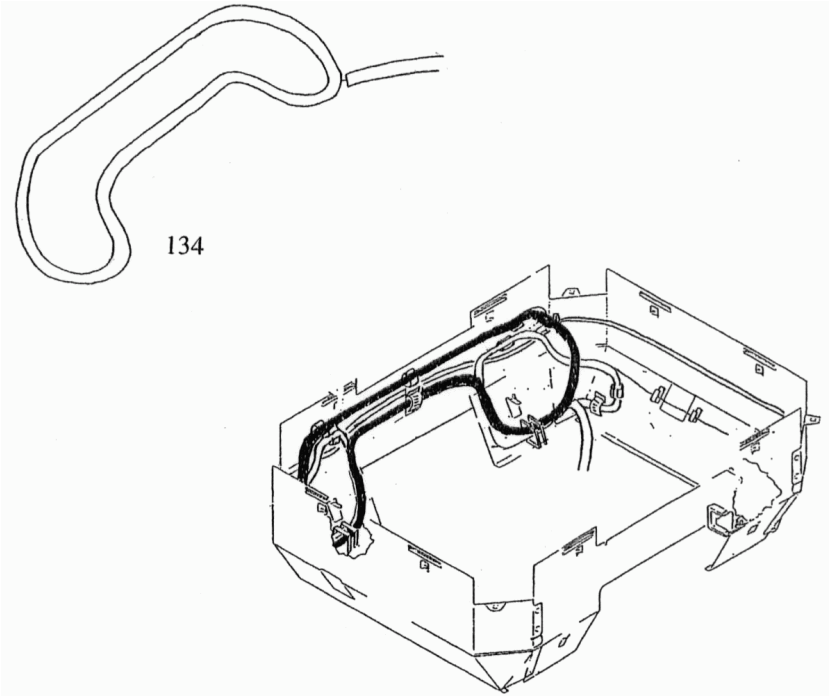
- Before you disassemble the set, turn off power and pull out the power plug.
- Use the appropriate screwdrivers that fits the screws. If you use screwdriver that does not fit, you may break the screws.
- Disassembly is the opposite process of assembly.
- Carefully discharge the CRT anode potential by grounding to coating dag before removing Anode Cap.

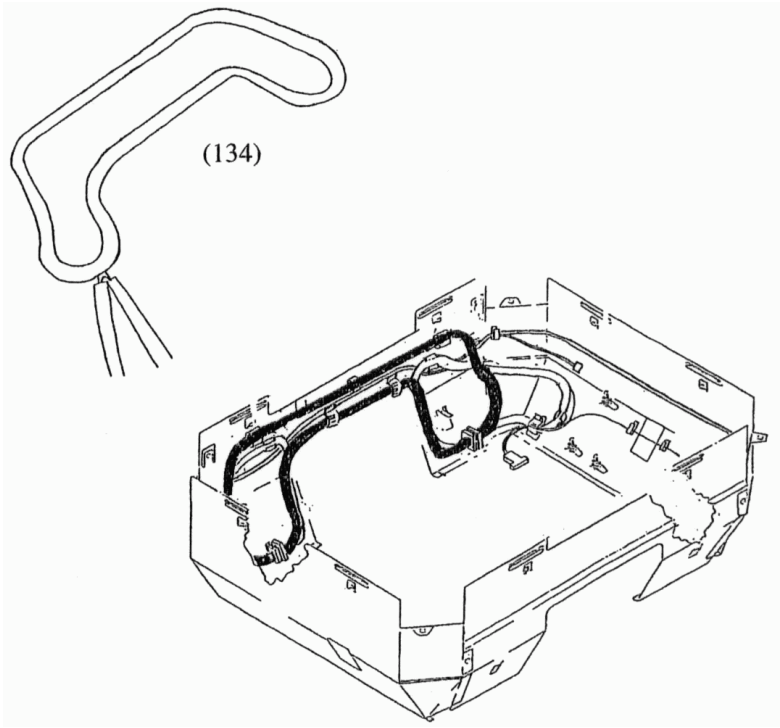
REMARK	SYMBOL	
Clamp the EMF COIL with CLAMPER. (4 point) The thick of the EMF COIL is placed between Ⓐ and Ⓑ.	132	

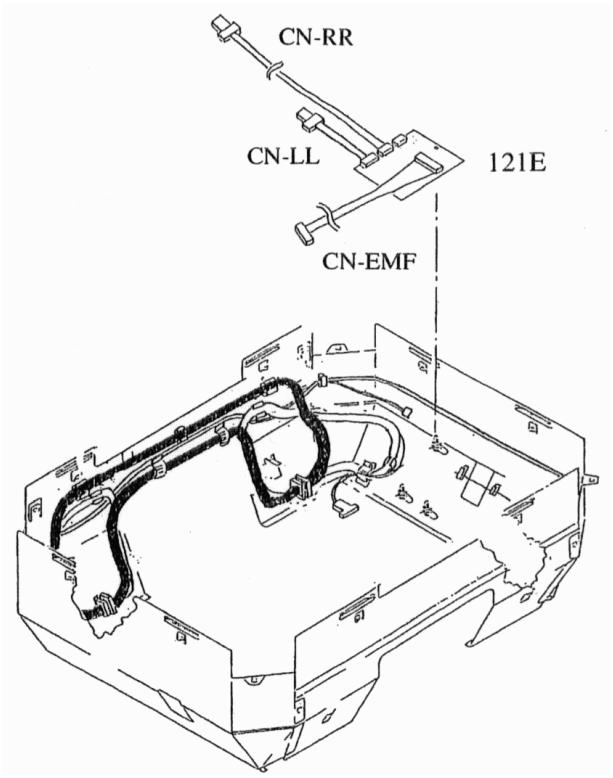
REMARK	SYMBOL	
Forming(Corner Coil)	133	

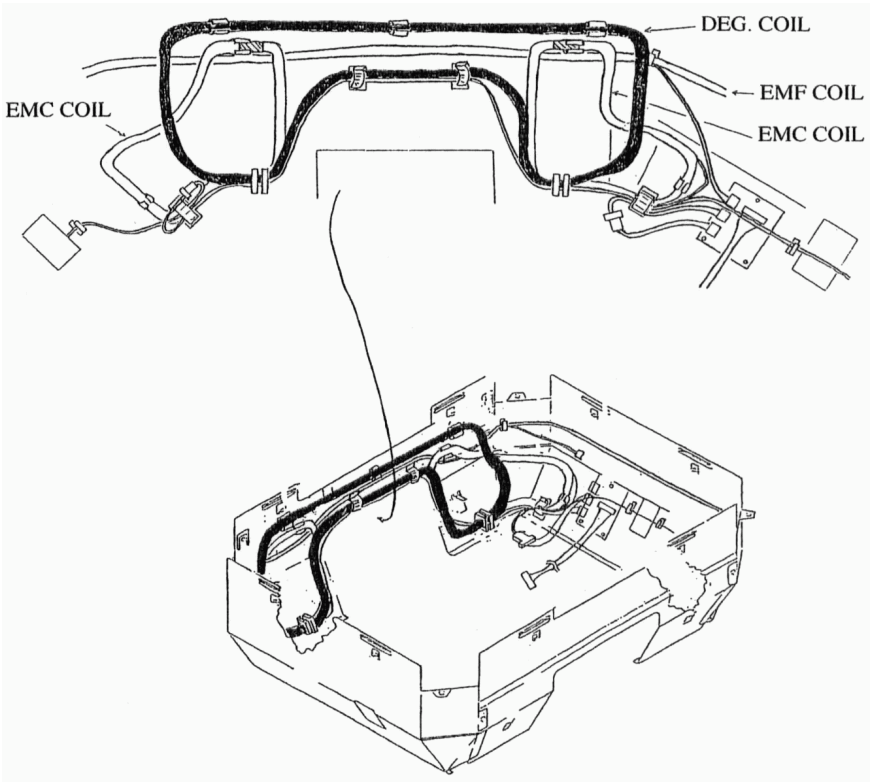
REMARK	SYMBOL	
Clamp the EMC COIL with CLAMPER, WIRE.	133	

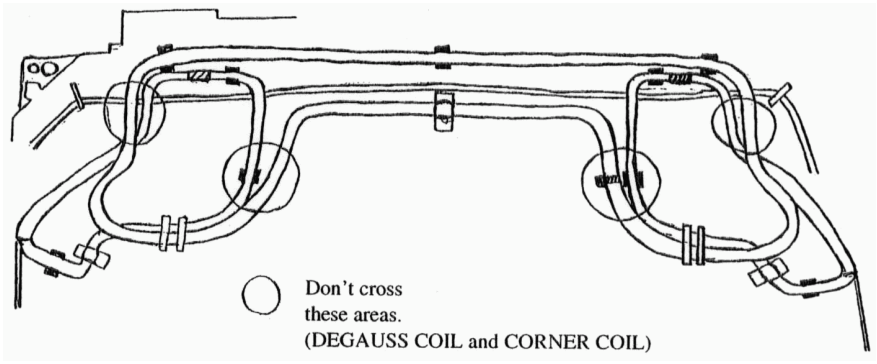
REMARK	SYMBOL	
Clamp the EMC COIL with CLAMPER, WIRE.	133	

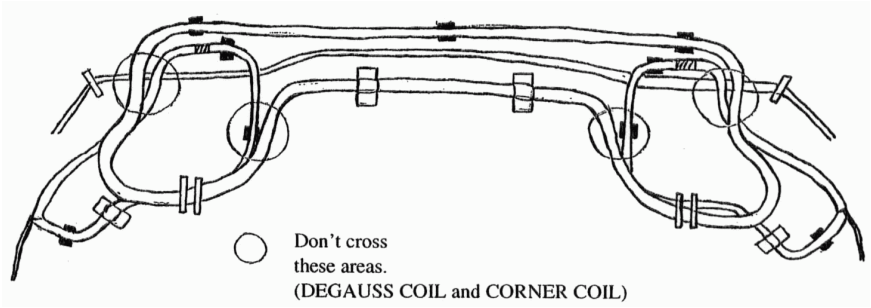
REMARK	SYMBOL	
Clamp the DEG COIL with CLAMPER, WIRE.	134	

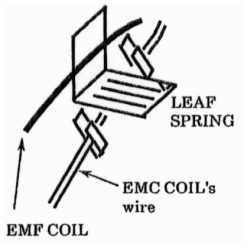
REMARK	SYMBOL	
Clamp the DEG COIL with CLAMPER, WIRE.	(134)	

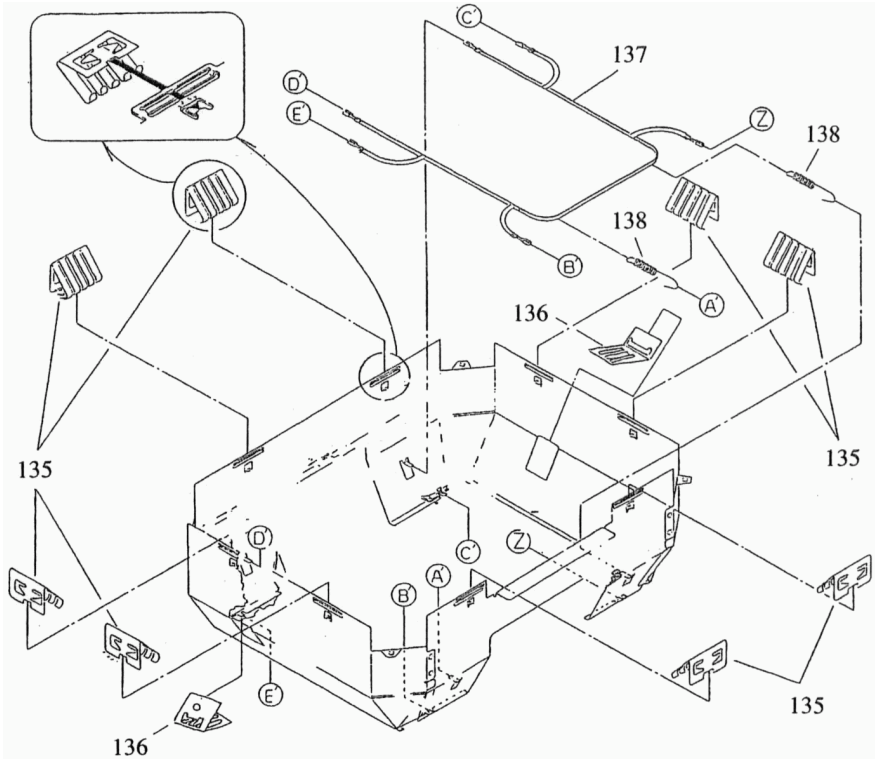
REMARK	SYMBOL	
Mount the EMF PWB.	121E	

REMARK	SYMBOL	
Clamp the connector.		

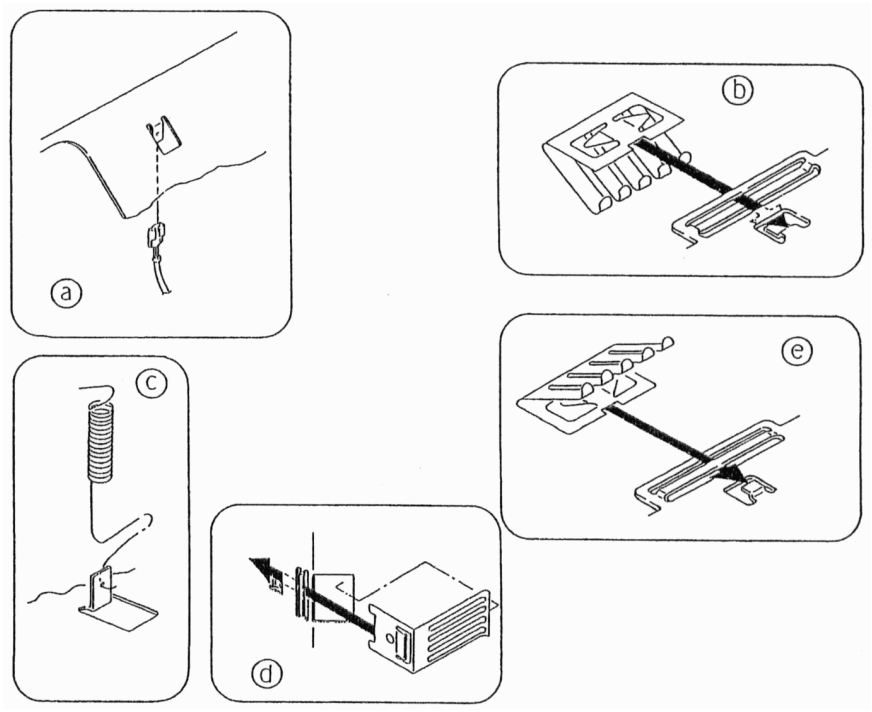
REMARK	SYMBOL	
COIL FORMING -UPPER SIDE-		

REMARK	SYMBOL	
COIL FORMING -LOWER SIDE-		

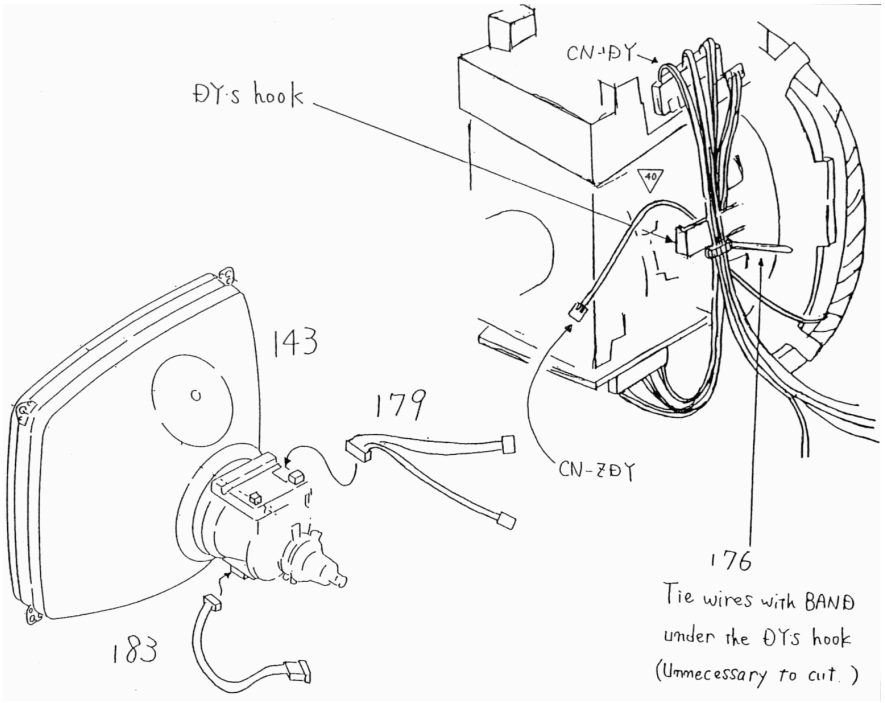
REMARK	SYMBOL
Mount LEAF SPRING(CRT) and LEAF SPRING to the PLATE, SHEILDING.	135 136
Mount CN-CE and COIL SPRING to the PLATE, SHEILDING.	137 138
EMC COIL's wire pass through under the LEAF SPRING.(both sides)  	
Don't change the form the LEAF, SPRING.	

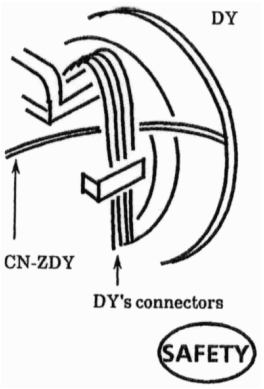


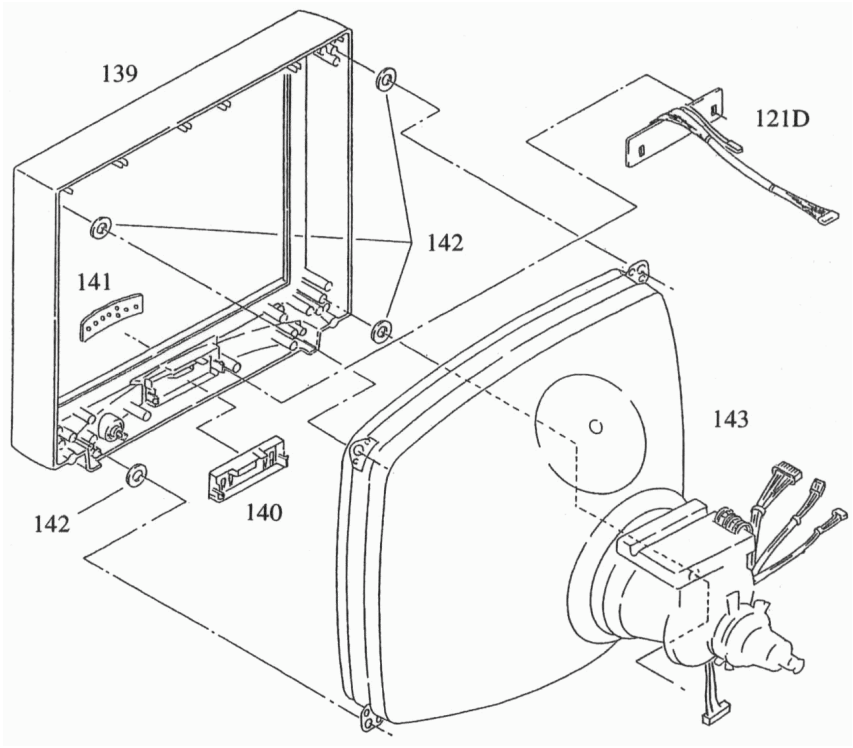
REMARK	SYMBOL



REMARK	SYMBOL
Insert CN-DY and CN-CA to CRT's DY. Note: Don't pull out CN-DY if you insert it once. SAFETY	143 179 183
Tie CN-DY, DY's wires and CN-ZDY with BAND(L=100) as per sketch. SAFETY	176



REMARK	SYMBOL
Mount PUSH BUTTON (CONTROL) to CABINET FRONT ASSY.	139 140
Peel off the sheet of CNTROL PANEL and attach PUSH BUTTON(CONTROL) to CABINET FRONT ASSY.	141
Pass through the CN-ZDY between DY and DY's connectors.  	

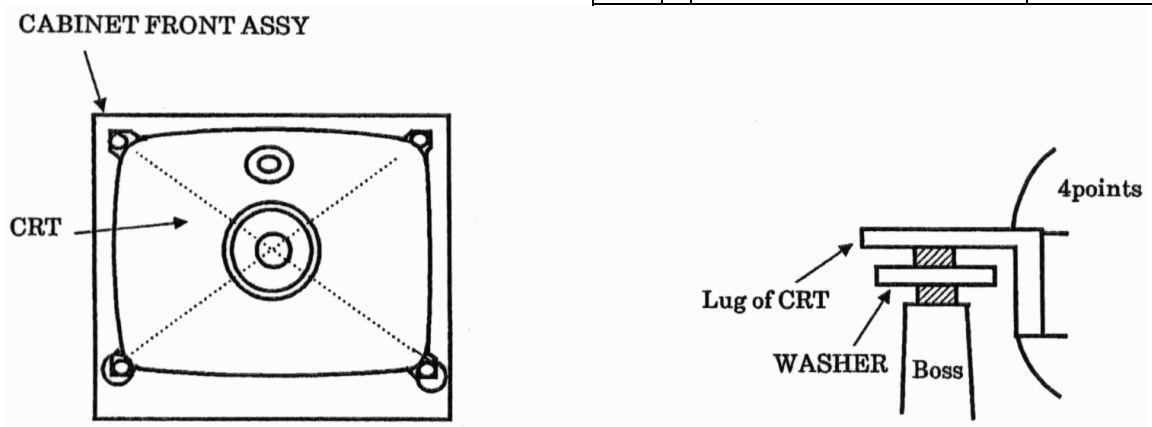


Screw CRT on CABINET, FRONT (4 point).

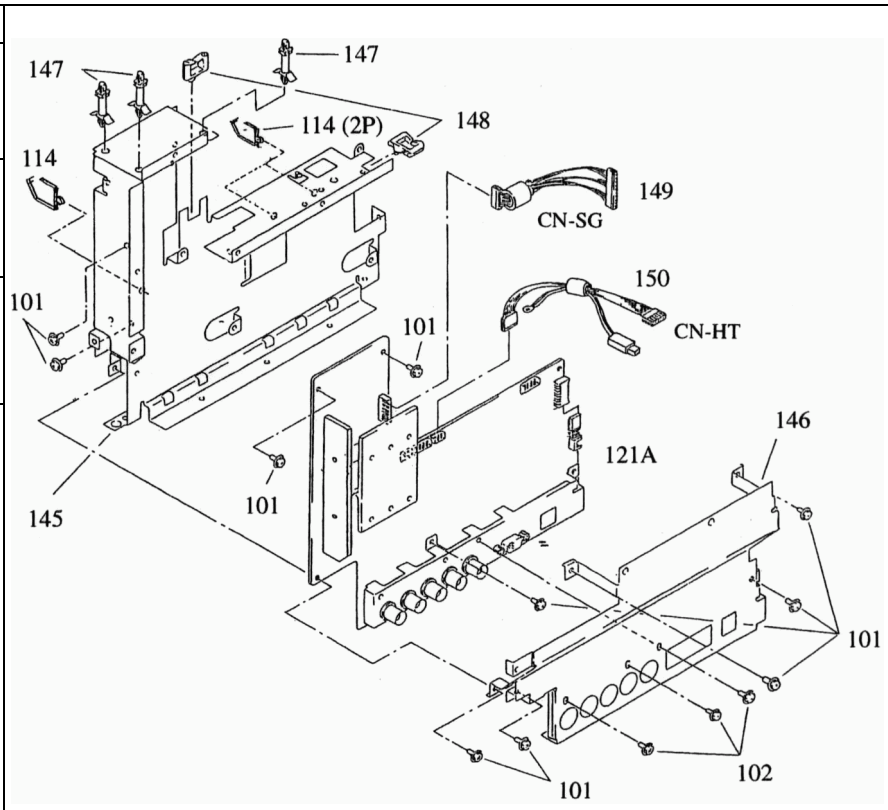
The use of WASHER at setting CRT

1. Necessary to make sure the screw condition of each Lot.
   Make sure the CABINET FRONT, it should not be whitish by stress of securing screws. And make sure the gap between CABINET FRONT and CRT. It must keep in tolerance.
2. In case of gap or changing color caused by stress, arrange the thickness of washers.

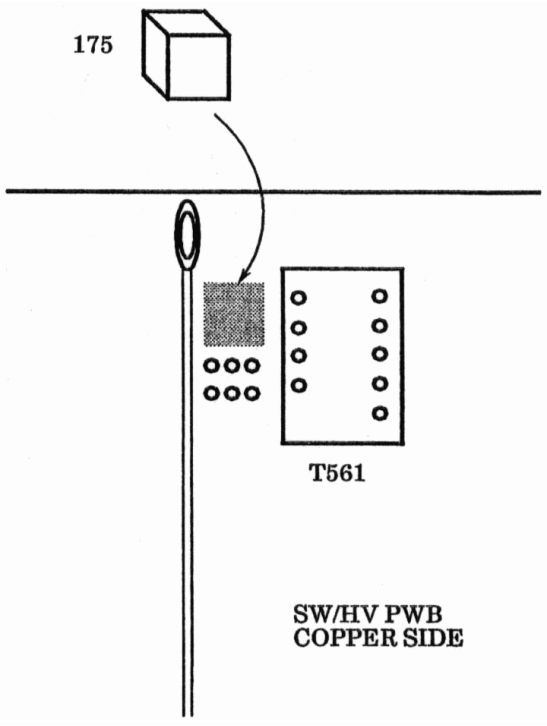
No.		DESCRIPTION	PART No.	Q'ty
142		WASHER (D20,D6.5,T2)		04
142		WASHER (D20,D6.5,T1)		or
142		WASHER (D20,D6.5,T1.2)		or
142		WASHER (D20,D6.5,T1.6)		or
142		WASHER (T0.5,P20)		or
142		WASHER, SPECIAL		or

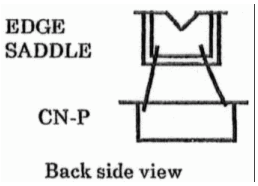


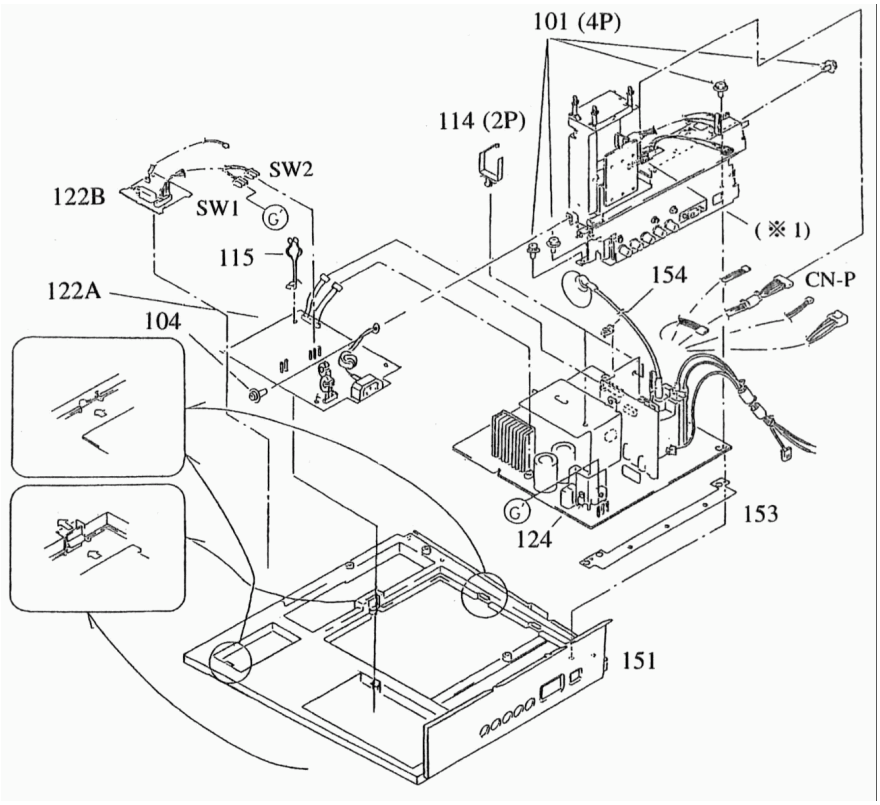
REMARK	SYMBOL
Screw VIDEO PWB ASSY to the PLATE SHEILDING (BOTTOM).	121A 101 145
Screw PLATE SHEILDING (VIDEO) to the VIDEO PWB ASSY.	101 102 146
Insert BUSH,INSULATOR, CLAMPER, WIRE and EDGE, SADDLE to the PLATE, SHEILDING(BOTTOM).	114 147 148
Insert CN-SG and CN-HT to the VIDEO PWB ASSY	149 150

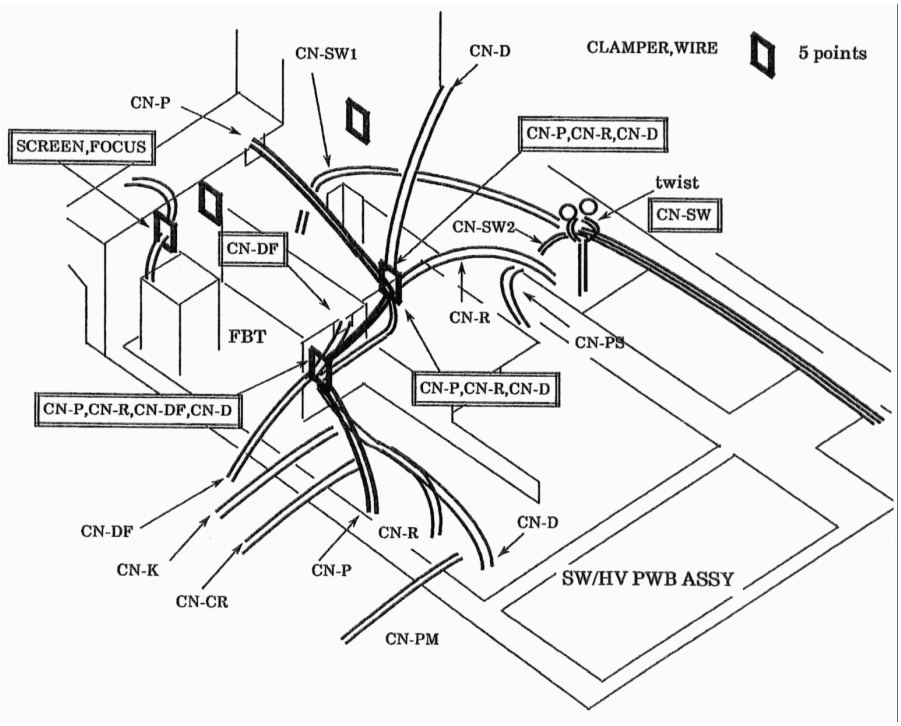


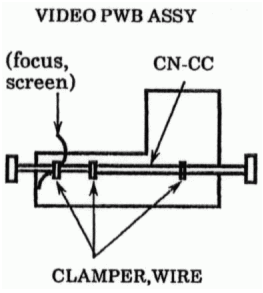
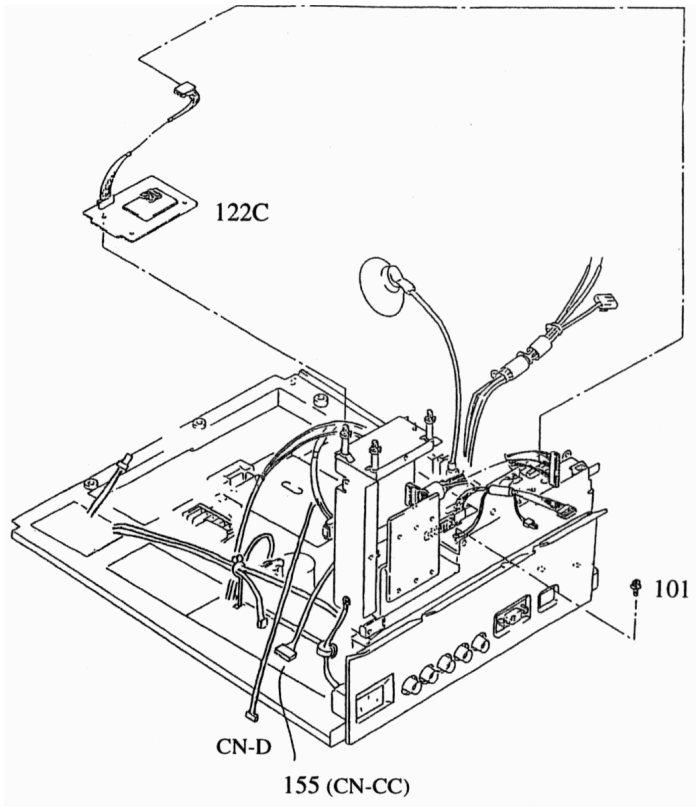
REMARK	SYMBOL
Attach the CUSHION SHEET on the SW/HV PWB ASSY.	175

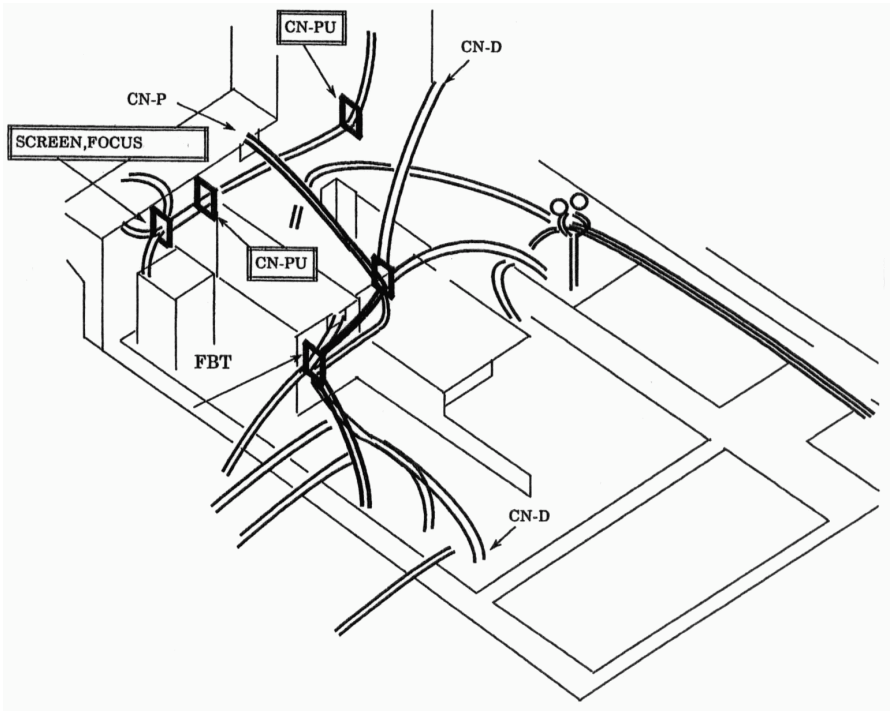


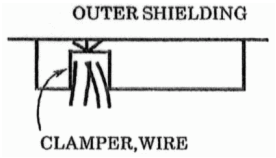
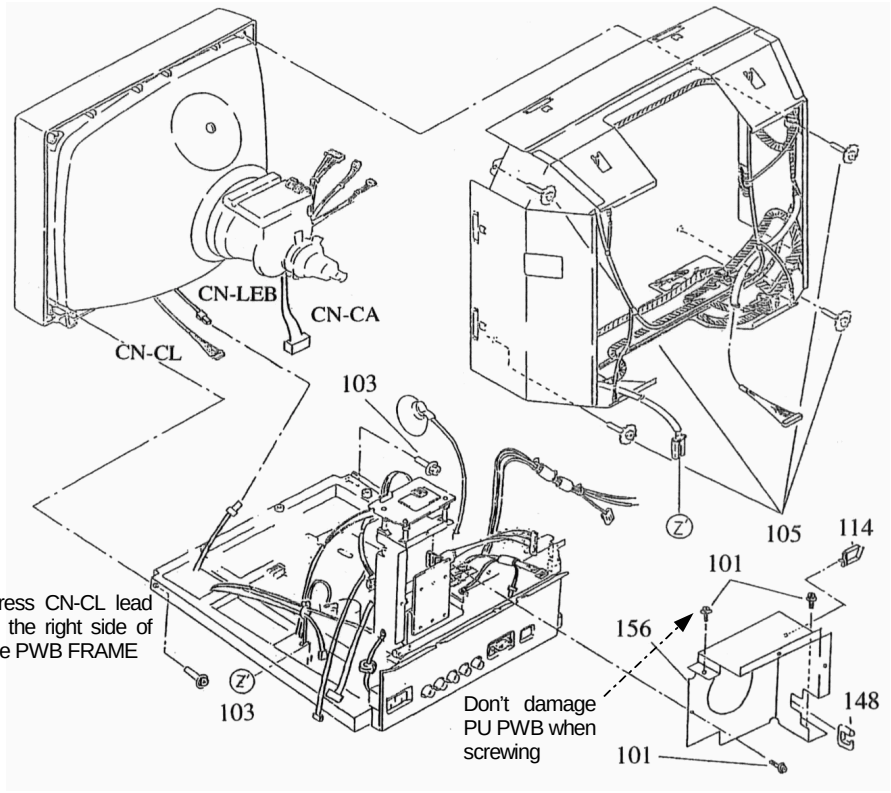
REMARK	SYMBOL
Clamp CN-P with the EDGE SADDLE.  	(*1)
Screw the safety earth terminal to the BRACKET (VIDEO,A). SAFETY	104
After the VIDEO PWB ASSY mount the PWB FRAME, connect the CN-SW1.	

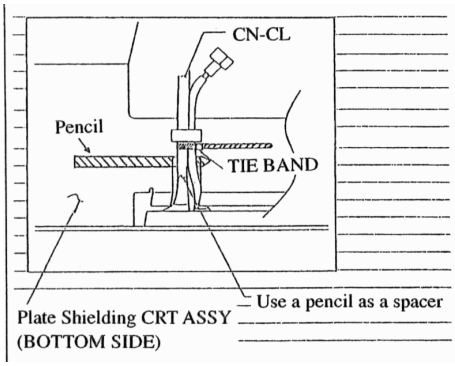
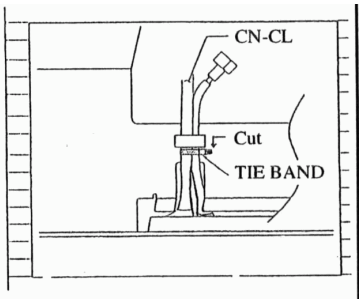


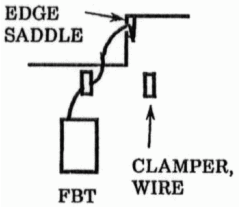
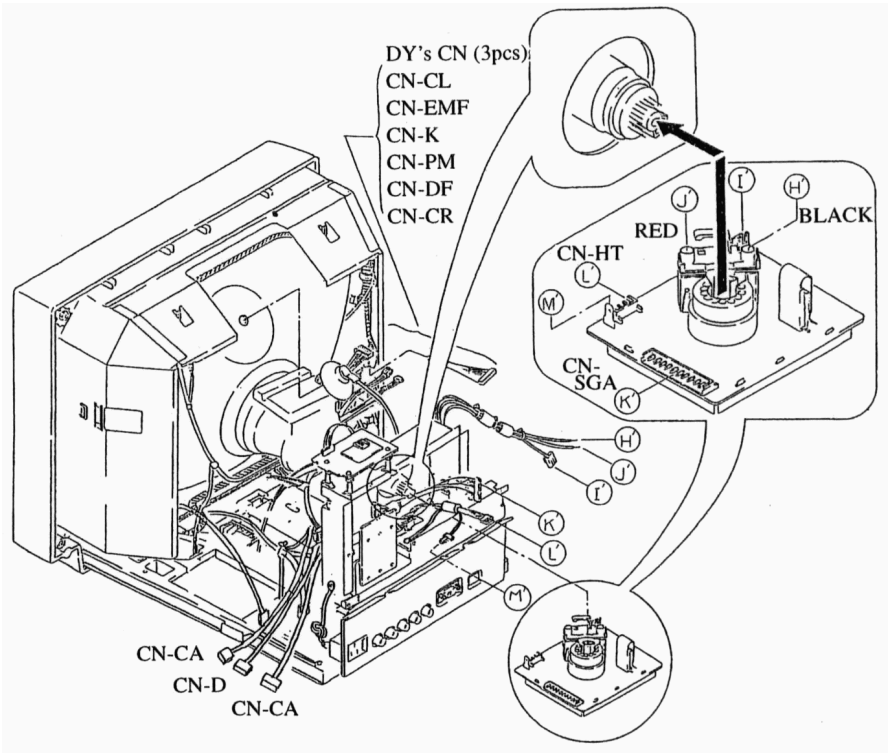
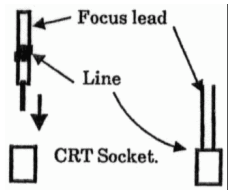
REMARK	SYMBOL	
Clamp the wires with the CLAMPER,WIRE as follows.		

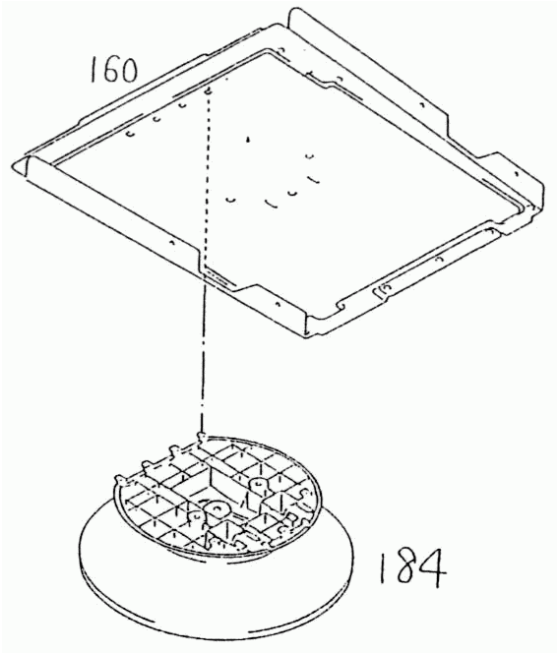
REMARK	SYMBOL	
Clamp the CN-CC. 	155	
Don't touch copper wire of IC4H1. (Because copper wire is easy to break.)	122C	

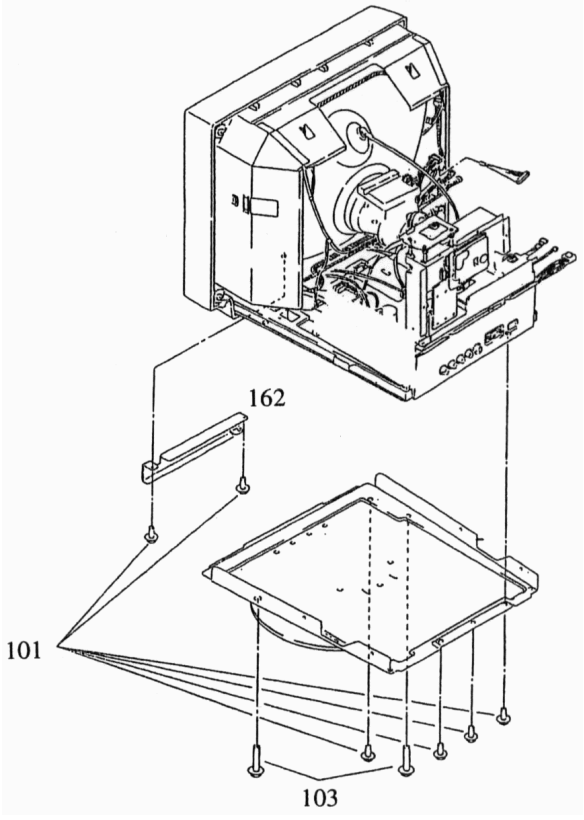
REMARK	SYMBOL	
Clamp CN-CU with the CLAMPER,WIRE as follows.		

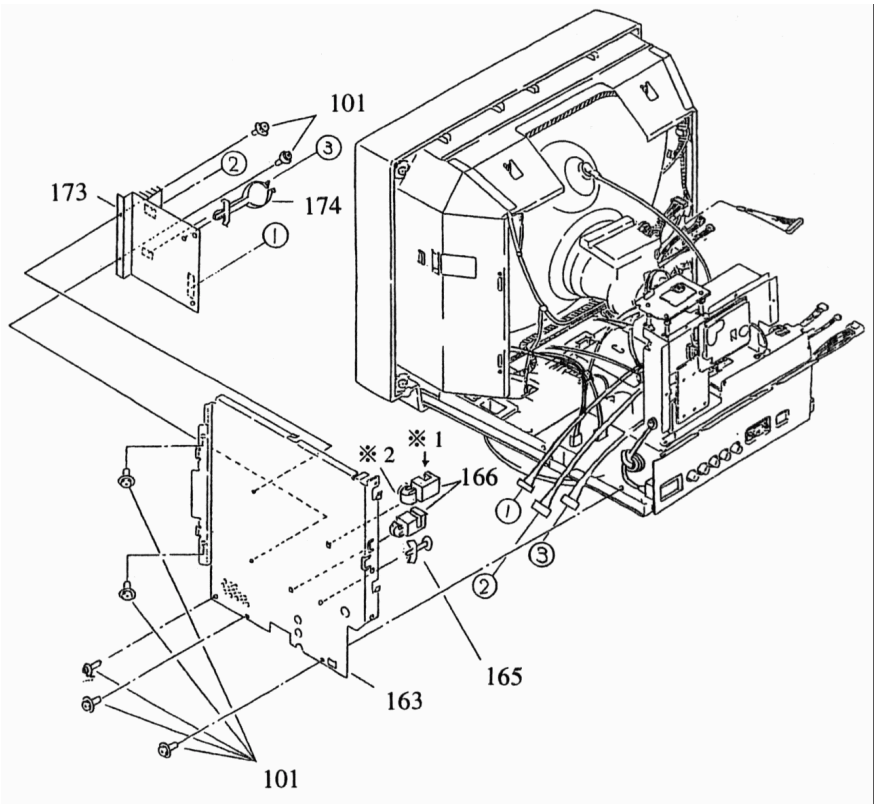
REMARK	SYMBOL	
Clamp CN-CL and CN-LEB with the CLAMPER,WIRE (bottom side of the OUTER SHIELDING). 		
After mounting the CABINET FRONT ASSY to the FRAME ASSY,SCREW the CASE,SHIELDING(CRT,F) (To avoid broken CRT neck)	156	

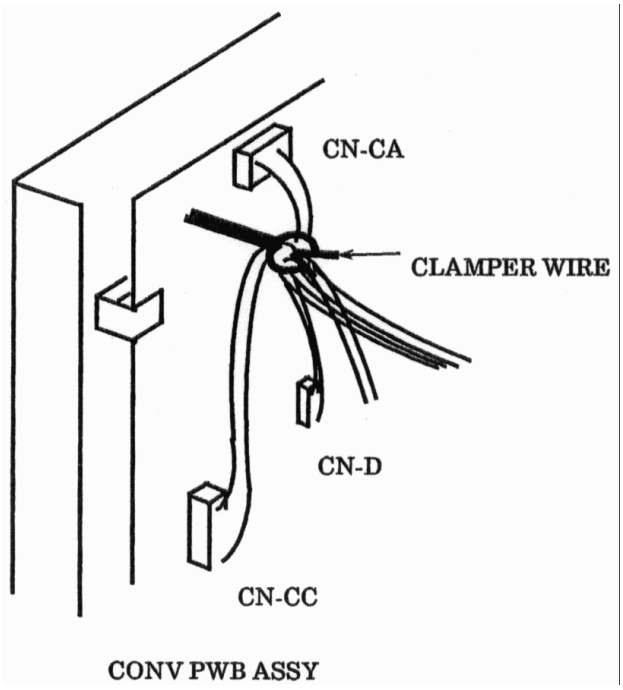
REMARK	SYMBOL	
Tie CN-CL and CN-LEB with BAND (L=100). Note:Use a pencil as a spacer.	144	Insert a pencil between PLATE SHIELDING CRT ASSY and CN-CL, CN-LEB as per sketch.  After tie BAND(L=100), pull out a pencil. 

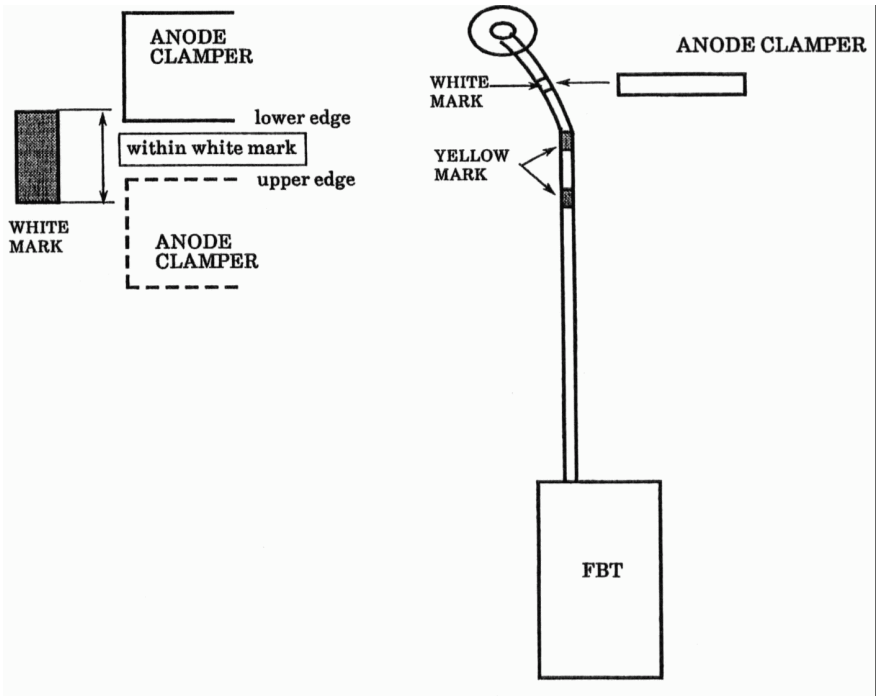
REMARK	SYMBOL	
Clamp the leads of FBT with the EDGE SADDLE. 		
Insert the Focus Lead to the CRT Socket. Push in Focus lead so that the Line is all in the CRT Socket. 		
Mount the Anode cap as follows. 		

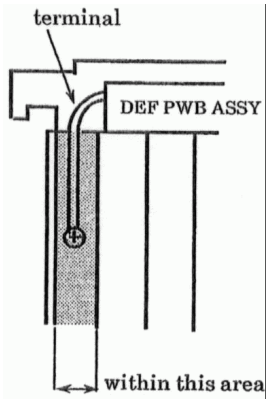
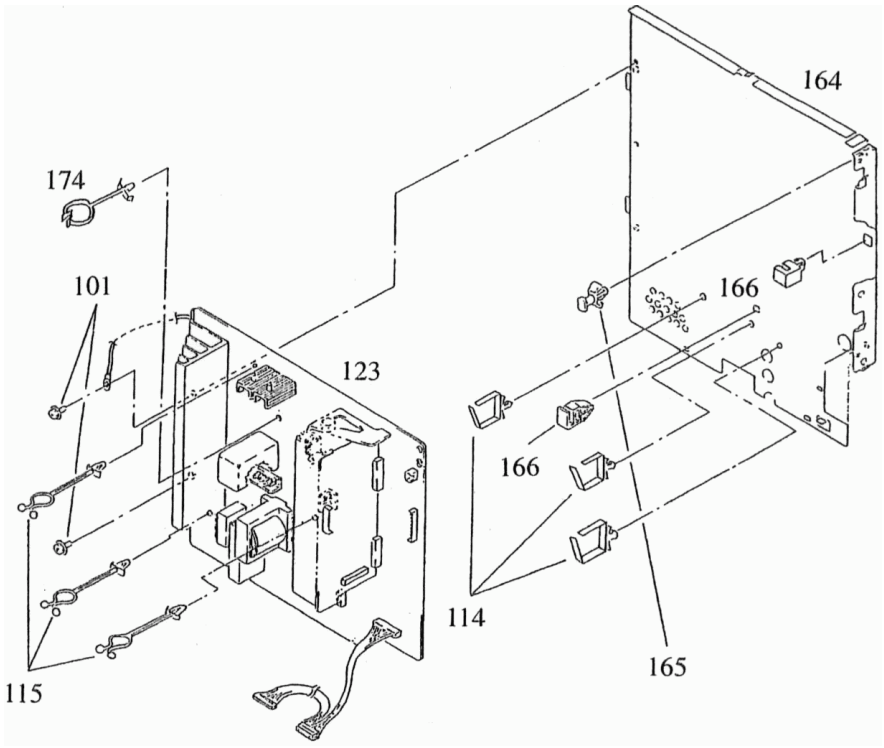
REMARK	SYMBOL	
Mount the REVOLVING STAND ASSY to the CHASSIS BASE. Degauss both the outside and inside surfaces of the CHASSIS BASE.	160 184	

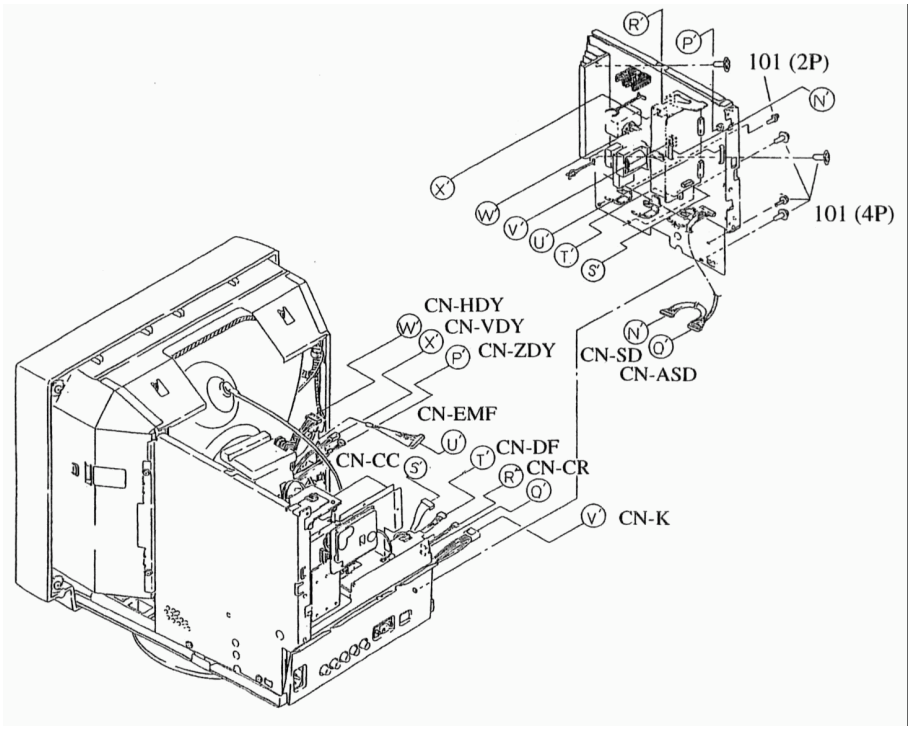
REMARK	SYMBOL	
		

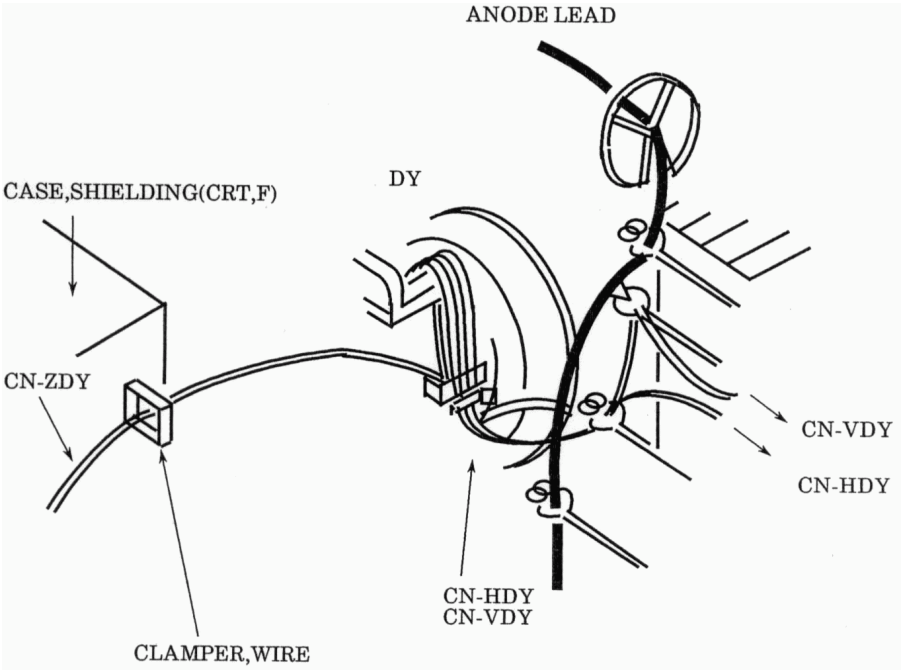
REMARK	SYMBOL	
		

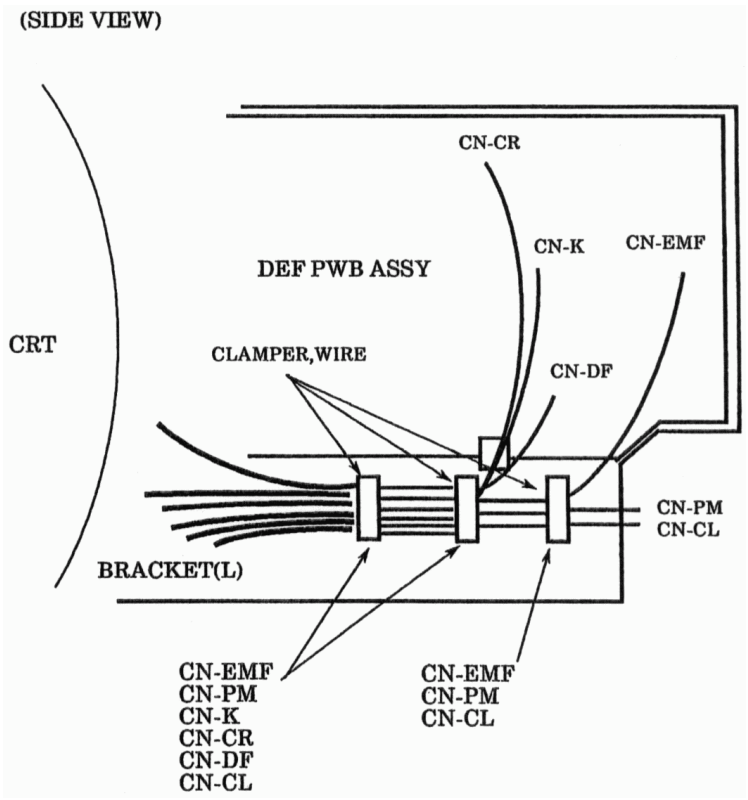
REMARK	SYMBOL	
Clamp CN-CA, CN-CC and CN-D with CLAMPER WIRE.		

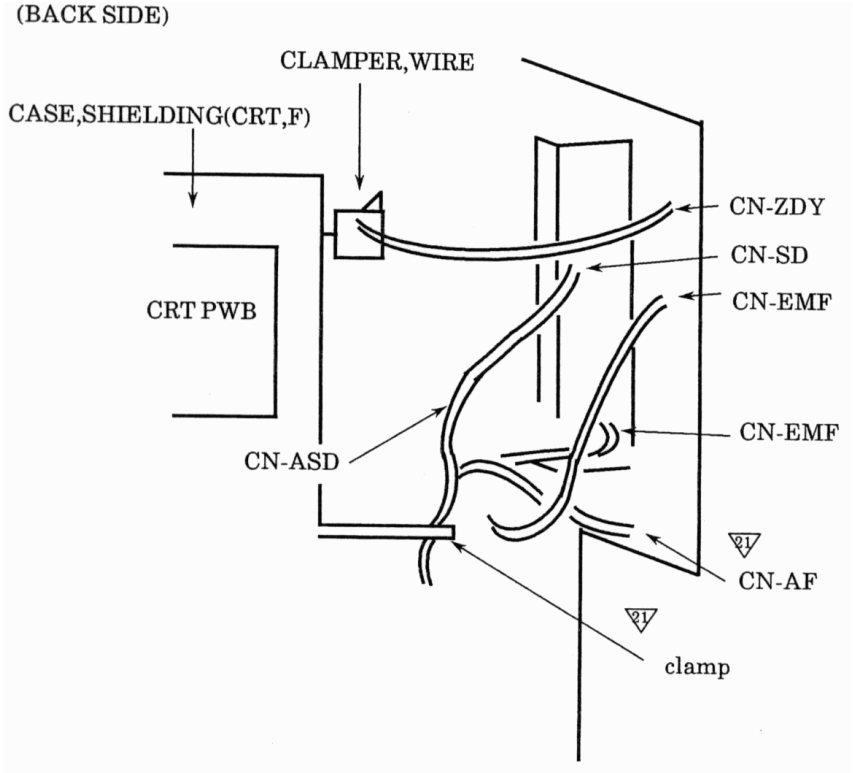
REMARK	SYMBOL	
Mount the ANODE CLAMPER to ANODE LEAD. (True up the upper ANODE CLAMPER and above WHITE MARK.) SAFETY	167	

REMARK	SYMBOL	
Screw the terminal from HEAT SINK with DEF PWB ASSY. 		

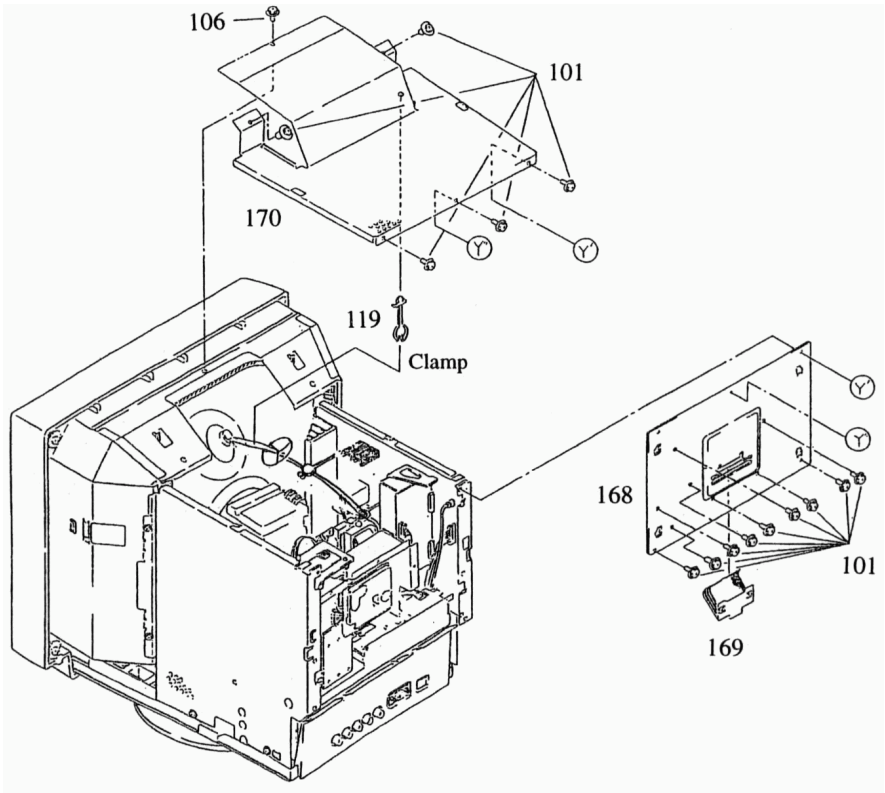
REMARK	SYMBOL	
Before screw the BRACKET(L), connect the wires.) CN-HDY CN-VDY CN-CR CN-K CN-DF CN-SD CN-ASD CN-EMF CN-ZDY CN-CC CN-CL CN-PM		
Clamp the wires. (Detail next page.)		

REMARK	SYMBOL	
Clamp the wires. SAFETY		

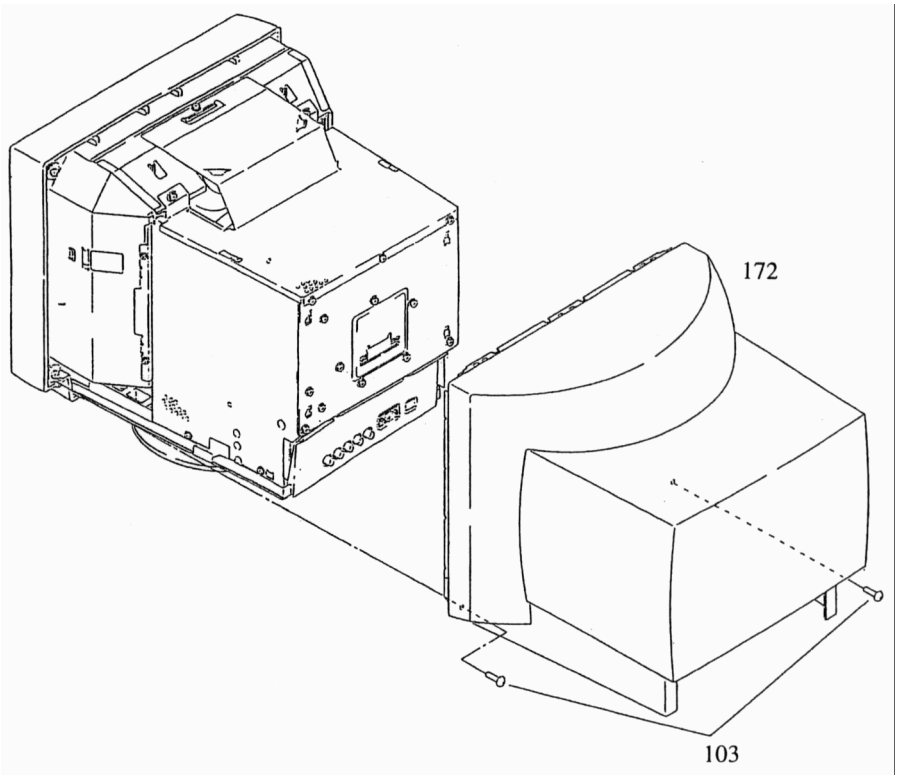
REMARK	SYMBOL	
Clamp the wires. SAFETY		

REMARK	SYMBOL	
Clamp the wires. CN-ASD CN-AF	21	

REMARK	SYMBOL
Clamp the ANODE LEAD with the CLAMPER WIRE(H19.5) SAFETY	119
Don't change the form the LEAF,SPRING.	169



REMARK	SYMBOL



SYMBOL	PARTS No.	DESCRIPTION	Qty	REMARKS
101	2E853031	CHEXIBS(CUP)*3*8*15CF	54	
102	2E853031	CHEXIBS(CUP)*3*8*15CF	05	
103	24851731	SCREW,FT*4*16*15BF(S)	06	
104	24852341	SCREW,WM*4*10*15CF(S)	01	
114	25283461	EDGE SADDLE	01	
115	25284061	CLAMPER,WIRE	04	
119	25283111	CRAMPER WIRE (H19.5)	01	
121	843E6C03	VIDEO PWB ASSY	01	
121	843E7C01	VIDEO PWB ASSY	01	
122	843E6B01	SUB PWB ASSY	01	
123	843E6D02	DEF PWB ASSY	01	
124	843E6A01	SW/HV PWB ASSY	01	
132	61322304	COIL(50T,40H)	01	EMF
133	61322303	CORNER COIL(190T,50H)	02	EMC
134	61322101	DEGAUSSIING COIL(85T,10H)	01	DEG
135	741X9741	LEAF SPRING(CRT)	08	
136	741E9881	LEAF SPRING	02	
137	73891347	WIRE CONNECTOR CN-CE	01	CN-CE
138	25534632	COIL SPRING	02	
139	2E323932	CABINET FRONT ASSY	01	
140	2E457751	PUSH BUTTON(CONTROL)	01	
141	25430551	CONTROL PANEL	01	
142	24N00301	WASHER(D20,D6.5,T2)	04	
143	33022503	CRT M51LRY22X61	01	CRT
145	2E548181	BRACKET(VIDEO.A)	01	
146	744E0351	PLATE,SHIELDING(VIDEO)	01	
147	24282111	BUSHING,INSULATOR	03	
148	25282131	EDGE SADDLE	03	
149	73891360	WIRE CONNECTOR CN-SG	01	CN-SG
150	73891333	WIRE CONNECTOR CN-HT	01	CN-HT
155	73891362	WIRE CONNECTOR CN-CC	01	CN-CC
156	744E0311	CASE,SHIELDING(CRT,F)	01	
160	2E548061	CHASSIS BASE	01	
162	744E0441	PLATE.SHIELDING(BOTTOM)	01	
163	2E548141	BRACKET(R.B)	01	
164	2E548131	BRACKET(L.B)	01	
165	25280851	BUSHING,INSULATOR	02	
166	25281421	PWB HOLDER	04	
167	25282111	ANODE CLAMPER	01	
168	744E0431	PLATE.SHIELDING(BACK)	01	
169	741X4311	LEAF SPRING(CRT.B)	01	

SYMBOL	PARTS No.	DESCRIPTION	Qty	REMARKS
170	744E0421	PLATE.SHIELDING(TOP)	01	
172	2E322123	CABINET BACK	01	
173	843E6P01	CONV PWB ASSY	01	
174	25282992	CLAMPER WIRE (H29.5)	02	
175	25618341	CUSHION SHEET	01	
176	24280701	BAND (L=100)	01	
179	73891431	WIRE CONNECTORE CN-DY	01	CN-DY
183	73891450	WIRE CONNECTORE CN-CA		CN-CA
184	2E430782	REVOLVING STAND ASSY	01	

ADJUSTMENT PROCEDURES

Application

These specifications outline the adjustment procedures for Model FP1370 (A)/(B) 22-inch color monitor.

Model Name: FP1370 (A)/(B)
Destination: North America, Europe Standard Adjustment Conditions

Standard Adjustment Conditions

1. Power Supply Voltage

A / B Version: AC 100V±5% 50/60Hz or AC 120V±5% 60Hz or
AC 220V±5% 50Hz

2. Warm Up

Adjust this monitor after a minimum of 90 minutes to allow unit to reach ambient operating temperature.
(Use the Self Test screen. Refer item 7-5-3. about Self Test.)
※ Adjust the monitor according to item “Rough Adjustment before warm up” before warm up.
※ When aging, cover with back cabinet or aging jig.

3. Signals

Unless otherwise specified, adjustment should be Mini D-SUB 15 pins.

Video: Analog 0.7±0.01 Vp-p Positive polarity (terminated at 75 ohms±1%)
or Analog sync. on green
Video 0.7±0.01 Vp-p positive polarity
Sync 0.3±0.01 Vp-p negative polarity
(terminated at 75 ohms ±1%)

Sync.: TTL level (High level : more than 2.4V / Low level : less than 0.8V)
H/V separate, positive / negative polarity
or H/V composite, positive / negative polarity
or Sync. on green, 0.3±0.01 Vp-p negative polarity
(terminated at 75 ohms ±1%)

4. Magnetic Fields

Vertical Magnetic Fields: 40±1uT Horizontal Magnetic Fields: 30±1uT

* Unless instructed otherwise, the CRT face should be facing to the east.
* Degauss the entire unit with an external degaussing coil for the adjustment.

※Notes about degaussing method

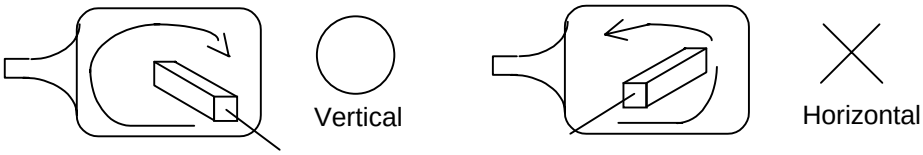
Follow the degaussing procedure below. (To prevent intertwinement of aperture grille)

1) Use cylinder-shaped degaussing coil. Do not use ring degaussing coil. But ring degaussing coil can be used at degaussing chassis.

2) In order to remove a magnetization from top sides, base shield and chassis, degauss each side.
Do not switch off the degaussing coil abruptly. Move the degaussing coil slowly when degaussing.
Note: If the degaussing coil is switched off near the set, the set will be magnetized.

3) To degauss panel surface

Switch on the degaussing coil, keep a distance between panel surface and degaussing coil to more than 50 cm. Move the degaussing coil vertically near the panel surface.
Keep distance of panel surface and degaussing coil to more than 15 mm.

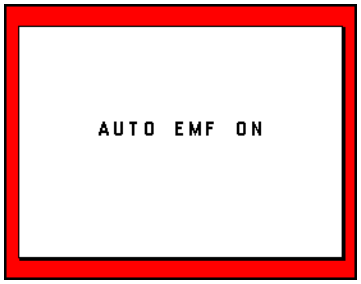


4) Degaussing method of CRT surface

Starting from edge of CRT, move the degaussing coil toward CRT center in circular motion, spending 6 to 7 seconds. (about 4 or 5 round)
When LED is orange in factory mode (“AUTO EMF ON” appear on OSM or TAG 3, TAG 4, TAG 5, TAG B, TAG C is selected), Do not degauss.
In user mode, do not degauss except when “DEGAUSS OK” appear on OSM.

Service Factory MODE: Auto EMF function is off. (LED is yellow)

Auto EMF function off -> on (LED is orange.)

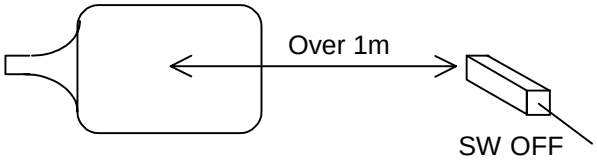


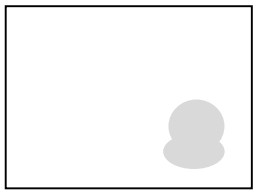
a. TAG 3, TAG 4, TAG5, TAG B, TAG C is selected.
b. When OSM MENU disappear, Push “+” and “▲” switch at once.
Then “AUTO EMF ON” appear on OSM, and AUTO EMF function is on state.
Push any switch and power on/off, AUTO EMF function become off state.
But when receive frequency change, AUTO EMF function stay on state.

User MODE: Auto EMF function is on.(LED is green)
Auto EMF function on -> off

a. Open the MENU (U),TAG7)-"DISPLAY MODE", and Press "+" and "▲" switch at once.
b. Then "DEGAUSS OK" appear on OSM, and AUTO EMF function is on state.
When push any switch and power on/off, AUTO EMF function become off state.
But when receive frequency change, AUTO EMF function stay on state.

5) After sufficiently degaussing the CRT, move degaussing coil slowly away from the panel surface while rotating from corner to center, taking more than 3 seconds.
Turn off SW more than 1 m away from the CRT. Degauss again if the unit is gassed.




Magnetized Pattern Example

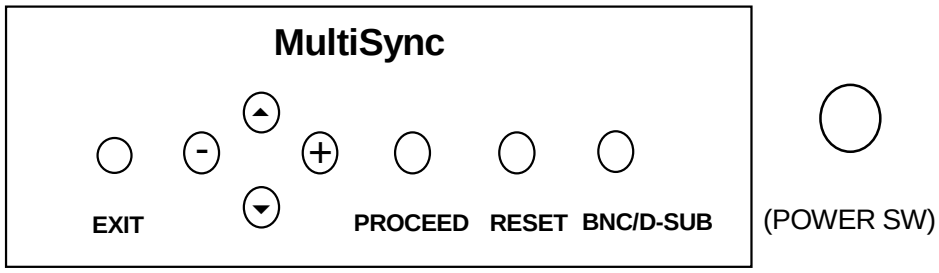
6) When aperture grille get entangled while degaussing, receive the signal of 1dot alternate pattern and degauss again. If aperture grille remain entangled, Put vibrate from side.

5. Signal Generator
LVG-1603 is recommended for signal generator.
Use calibrated signal generators. However, use VG-819 in focus regulation.
Note) Adjustment timings are timing tables and are not programmed timing.

6. Color Analyzer, Convergence Meter, Landing Mater
The color analyzer should be CA-100 (made by MINOLTA) or compatible.
The convergence meter should be CC-100 (made by MINOLTA) or compatible.
The Landing meter should be KLD-01 (made by KAMAYA) or compatible.

7. OSM Menu Operation

7-1. Front Panel



7-2. OSM Menu

This unit is adjusted in on screen menu by front panel key operation.

There are 2 types of On Screen menu.

1) Menu (user): This Menu can be operated by a customer.

2) Menu (service): This Menu is hidden from a customer.

Here after, they will be called MENU (U) and MENU (S).

The menu can be displayed when the signal is input to the display unit.

7-3. FACTORY MODE

This model has function that is named "FACTORY MODE"

When the FACTORY MODE is

ON: LED indicator light is yellow usual. But when TAG 3, TAG 4, TAG 5, TAG B or TAG C is selected, LED indicator light is orange.
Power management function does not work.
It is possible to enter MENU (S) by shortcut key.

OFF: LED indicator is GREEN when Horizontal and Vertical Sync Pulse are ON.
Power management function works when the Horizontal or (and) Vertical sync are OFF.
It is not possible to enter MENU (S) by shortcut key.

Always turn on “FACTORY MODE”, when adjust the monitor.

If the adjustment finish, should be “FACTORY MODE” OFF.

7-4. FACTORY MODE SETTING

7-4-1 FACTORY MODE: OFF → ON

1) Open the MENU(U),TAG7－"DISPLAY MODE"(As below)
2) Press "RESET" and "▲","▼" switch at once.
3) A "WARNING" will be displayed, then press "PROCEED" switch once.
4) LED indicator light turn to Yellow from Green.

7-4-2 FACTORY MODE ON → OFF

1) When OSM MENU is displayed, press "EXIT" switch twice. Otherwise, press "EXIT" switch once.
2) A "WARNING" will be displayed, then press "EXIT" switch once.
3) LED indicator light turns to Green from Yellow.

7-5. Displaying the OSM.

7-5-1 FACTORY MODE: OFF

MENU(U)：Press "EXIT" or "+" , "-" , "▲" , "▼" , "PROCEED" once .

MENU(S)：Open MENU, TAG7 "INFORMATION" - "DISPLAY MODE”, and press "RESET" and "▲" , "▼" switch at once.

A warning message will be displayed, then press "PROCEED" switch.

7-5-2 FACTORY MODE: ON

MENU(U)：Press "+" , "-" or "▲","▼" switch.

MENU(S)：Press "PROCEED" switch once.

7-5-3 Self Test

When FACTORY MODE is ON, Self test is on by no signal.

When FACTORY MODE is OFF, Self test in on by power on with pushing “RESET” switch.

7-6. How to turn off OSM MENU

* To close the Menu

Press "EXIT" switch while MENU (U) or MENU (S) is displayed

TAG is highlighted	:	1 time.
ITEM is highlighted	:	2 times.
Entering SUB MENU	:	3 times

* To close MENU temporarily.

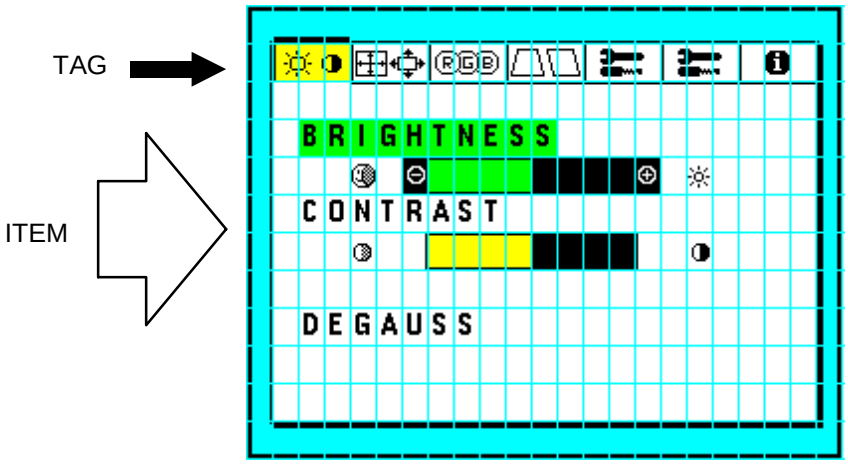
Press "PROCEED" once, while MENU (S) is being displayed.

Press "PROCEED" once more, MENU (S) is displayed again.

7-7. TAG, Item, Sub Menu Change

TAG to TAG	: Push "-" SW or "+" SW.
TAG to item	: Push "▲" SW or "▼" SW
Item to sub Menu	: Push "PROCEED" SW once.
Item to item	: Push "▲" SW or "▼" SW.
Sub Menu to item	: Push "EXIT" SW once.
Item to TAG	: When top item is selected, push "▲" SW.
	When bottom item is selected, push "▼" SW.

Push "EXIT" all items.



7-8. To change Data values

Data values are changed by pressing "-" or "+" switch.

7-9. To save Data Value.

Data values are saved for EEPROM, while highlighted ITEM is changed.

OSD MENU (S)

TAG1
- H.SIZE MAX.1
- H.SIZE MAX.2
- H.D.FOCUS
- V.D.FOCUS
- H.LINEARITY1
- H. LINEARITY2
- SLFTST SYNC BAND

TAG2
- V.LINEARITY
- V.LIN.BALANCE
- V.SIZE MAX
- V.RASTER CENTER
- H.POSITION
- V.POSITION
- H.SIZE
- V.SIZE

TAG3
- SIDE PIN
- SIDE PIN BAL.
- ALIGN
- TILT
- S-WAVE
- SIDE WING
- ROTATE

TAG4
- CORNER TOP
- CORNER TOP BAL.
- CORNER BOTTOM
- CORNER BOTTOM BAL.

TAG5
- GLOBALSYNC
- EMF TOP RIGHT
- EMF TOP LEFT
- EMF BOTTOM RIGHT
- EMF BOTTOM LEFT

TAG6
- MOIRE OFFSET
- MOIRE PARABOLA T
- MOIRE PARABOLA B
- MOIRE SAW TOP
- MOIRE SAW BOTTOM

TAG7
- GAIN
- R GAIN
- G GAIN
- B GAIN
- OSM COLOR GAIN

TAG8
- SUB BIAS
- R BIAS
- G BIAS
- B BIAS
- CONTRAST MAX/MIN

TAG9
- G SUB BRIGHT
- B SUB BRIGHT
- R SUB BRIGHT

TAGA
- 1 2 3 4 5 (COLOR PRESET)
- R COLOR GAIN
- G COLOR GAIN
- B COLOR GAIN
- CONT.MAX.ADJ.

TAGB
- H.S.CONVER
- V.S.CONVER
- ROW
- COLUMN
- 4H
- 4V

TAGC
- H.CONVER SAW T
- H.CONVER PARA T
- H.CONVER SAW B
- H.CONVER PARA B
- V.CONVER SAW T
- V.CONVER PARA T
- V.CONVER SAW B
- V.CONVER PARA B

TAGD
- AUTO ADJUST H
- AUTO ADJUST L
- DESTINATION
- CONTRAST PRESET
- HOURS READ

TAGE
HOURS RUNNING:ON
:STANDBY
:SUSPEND
ROM:
CPU VERSION

OSD MENU (U)

TAG1 (BRT&CONT)
BRIGHTNESS
CONTRAST
DEGAUSS

TAG2 (SIZE&POSITION)
AUTO ADJUST
LEFT/RIGHT
DOWN/UP
NARROW/WIDE
SHORT/TALL

TAG3 (COLOR CONTROL)
1 2 3 4 5 (COLOR PRESET)
RED
GREEN
BLUE

TAG4 (GEOMETRY)
IN/OUT
LEFT/RIGHT
TILT
ALIGN
ROTATE

TAG5 (TOOL1)

MOIRE CANCELER	----	OFF
		ON / LEVEL
BASIC CONVERGENCE	----	HORIZONTAL
		VERTICAL
AREA CONVERGENCE	----	TOP HORIZONTAL
		TOP VERTICAL
		BOTTOM HORIZONTAL
		BOTTOM VERTICAL
CORNER CORRECTION	----	TOP
		TOP BALANCE
		BOTTOM
		BTM BALANCE
LINEARITY	----	VERTICAL
		VERTICAL BALANCE
GLOBALSYNC	----	GLOBALSYNC
		TOP LEFT
		TOP RIGHT
		BOTTOM LEFT
		BOTTOM RIGHT
SHARPNESS	----	1 / 2 / 3 / 4
FACTORY PRESET		

TAG6 (TOOL2)

LANGUAGE	----	ENGLISH / DEUTSCH / FRANCAIS / ESPANOL /
		ITALIANO / SVENSKA / JAPANESE
OSM POSITION	----	LEFT/RIGHT
		DOWN/UP
OSM TURN OFF	----	10 / 20 / 30 / 60 / 120 SECONDS
OSM LOCK OUT		
IPM	----	ENABLE / DISABLE
EDGE LOCK	----	1 / 2
REFRESH NOTIFIER	----	ON / OFF

TAG7 (INFOMATION)

DISPLAY MODE		
FITNESS TIPS	----	OFF / 15 / 30 / 45 / 60 / 90 / 120 MINUTES
MONITOR INFO		

ADJUSTMENT ITEMS

[A] Pre-Adjustment

1. High-Voltage Adjustment SAFTY (When circuit board energizing is examined.)

[B] Initial Settings

1. Control Setting

[C] Main Adjustment

1. Raster Position
   1-1. Horizontal Raster Position
   1-2. Vertical Raster Position
2. Linearity Adjustment
   2-1. Horizontal Linearity Adjustment
   2-2. Vertical Linearity Adjustment
3. Horizontal / Vertical Maximum Size Adjustment
   3-1. Horizontal Maximum Size Adjustment
   3-2. Vertical Maximum Size Adjustment
4. Deflection Distortion Adjustment
   4-1. Horizontal / Vertical Size Rough Adjustment
   4-2. Picture Tilt Adjustment
   4-3. Side Pincushion Balance Adjustment
   4-4. Side Pincushion Adjustment
   4-5. Trapezoid distortion Adjustment
   4-6. Parallelogram Distortion Adjustment
   4-7. Horizontal W-wave Distortion Adjustment
   4-8. Vertical S-wave Distortion Adjustment
   4-9. Corner Distortion Adjustment
   4-10. Overall Distortion Adjustment
5. Preset Picture Size and Position Adjustment
6. Video Amplitude Adjustment
   6-1. Settings
   6-2. Video Amplitude
   6-3. OSM Gain Adjustment
   6-4. Cut Off Adjustment SAFTY
   6-5. Contrast Tracking Adjustment
   6-6. Brightness Tracking Adjustment
   6-7. Color Preset Adjustment
   6-8. Maximum Brightness Adjustment
   6-9.Contrast preset adjustment
7. Focus Adjustment
8. Purity
9. Convergence Adjustment
10. Auto adjustment

[D] Reference

1. Adjustment Signal
2. Adjustment Signal timing
3. Connector , test pins

SAFTY : This MARK is important adjustment item for products safety.

[A] Pre-Adjustment

1. High-Voltage Adjustment (SAFTY) Signal 3 (VGA480) All Black

Initial Setting

SCREEN VR: Fully counterclockwise (MIN)

VR5T1: Fully counterclockwise (MIN)

This adjustment is made when circuit board energizing is examined.

1) Receive signal 3.

2) Adjust VR5T1 slowly so that high voltage is 27kV±0.2kV.

After adjusting, seal VR5T1 with a silicon adhesive and cap (Part No. 74106841).

[B] Initial Settings

1. Control Setting

Before adjusting, set the position of control as follows.

FBT	SCREEN VR	: Fully counterclockwise (MIN)
	FOCUS F1	: Mechanical center
	FOCUS F2	: Mechanical center
VR581		: Fully clockwise (MAX)
SW581		: CRT side

[C] Main Adjustment

Use this manual for aligning the monitor.

1) Push "RESET" SW to reset a highlighted item.

2) Close OSM menu and turn the power off.

3) Turn the monitor back on and confirm that the adjustment values / contrast / white balance / distortion values are the same before the Menu was closed.
When "PROCEED" SW is pushed by the condition which Menu (S) is displayed, OSM Menu will disappear. If "PROCEED" SW is pushed once more, OSM displays)

4) A highlight displays items of TAG 3, TAG 4, TAG 5, TAG B and TAG C, AUTO EMF function becomes ON, and Landing Rotation Convergence alters.
When it is moved from this items to the tag after the adjusted, AUTO EMF function is turned off, and Landing Rotation Convergence alters.

Previous setting

Signal: No. 3 (VGA480) All White

1) Screen VR setting
Open Menu (U), TAG 1 "BRIGHTNESS & CONTRAST" and push "RESET" SW.
Adjust SCREEN VR so that the back-raster is just disappeared.

2) FOCUS VR setting
Display OSM menu and adjust FOCUS F1 VR and F2 VR to be able to recognize characters.

3) Rough Adjustment before warm up Signal: No. 7 (VESA350@85) All White
Signal: No. 13 (MAC832*624) All White
Signal: No. 36 (H.HOLD2(130k) All Black
Signal: No. 29 (V.RASTER) All White

a. Rough adjustment of horizontal raster position

1) Receive signal 36.
2) Adjust SCREEN VR on the FBT so that the back raster just appears.
3) Make sure to set the position of control as follows :
   VR581 (on the DEF PWB) : Fully clockwise (MAX)
   SW581 (on the DEF PWB) : CRT side
4) Open Menu (S), TAG2 “H.SIZE” and adjust the horizontal size to inside the bezel.
5) If raster has approached on the left of displayed area, switch SW581 position to the CRT side.
   If raster has approached on the right of displayed area, switch SW581 position to VR581 side.
6) Adjust VR581 so that the raster edge is centered in the bezel.

b. Rough adjustment of vertical horizontal raster position

1) Receive signal 29. All White
2) Menu (S), TAG2 data on ”V.LINEARITY" are 90, and it confirms that data on "V.LIN.BALANCE" are 128.
   * When data are not 90 and 128, Open TAG2 ”V.LINEARITY" and TAG2 "V.LIN.BALANCE", and set up data.
3) Open Menu (S), TAG2 "V.SIZE", adjust "+", "-" SW so that the vertical raster size is 297±3.0 mm.
4) Open Menu (S), TAG 2 "V.RASTER CENTER" and push "RESET" SW.
5) Adjust the vertical raster and the space of the edge as listed below by switch. (Fig 1-2 reference)
   $| Ytop - Ybottom | \leq 1.0mm$
6) Push "EXIT" SW.

c. Rough adjustment of self test screen

1) Receive signal 7.
2) Open Menu (S), TAG1”. Make sure that data on " SLFTST SYNC BAND " is “1”.
3) Open Menu (S), TAG2 "V.POSITION" and adjust "+", "-" SW so that the picture is centered with in the screen.
4) Open Menu (S), TAG2 "V.SIZE" and adjust it so that top and bottom picture size may be 3-5mm from the bezel. When picture doesn't spread out, open Menu (S), TAG2 "V.SIZE MAX".
   If not able to set picture size, open Menu (S), TAG2 "V.SIZE MAX", adjust so that screen may become full with the bezel. And open Menu (S), TAG2 "V.SIZE" and adjust it so that top and bottom picture size may be 3-5mm from the bezel.
5) Receive signal 13.
6) Open Menu (S), TAG2 “H.SIZE” and adjust the picture size is just the bezel.
7) Display the self test screen.
   Note) Make sure that the screen is one image.
   If there is not stable, Open Menu (S),TAG1” SLFTST SYNC BAND” and adjust “-“ SW so that the data is “0”
8) Make sure that the picture size is just the bezel.

d. Screen VR Adjustment

1) Display the self test screen.
2) Adjusted with the screen VR so that the voltage of the video PWB TP-ABL may become
   4.64 (V) <ABL<8.14 (V).

1. Raster Position

1-1. Horizontal Raster Position Signal: No.36 (H.HOLD 2(130k)) All Black

1) Receive signal 36.
2) Adjust SCREEN-VR on the FBT so that the back raster just appears.
3) Make sure to set the position of control as follows.
   VR581: Fully clockwise (MAX).
   SW581: Set position to the CRT side.
4) Open Menu (S), TAG2 "H.SIZE", Horizontal Size and adjust "+", "-" SW so that the horizontal size is 396±2.0 mm.
5) If raster has approached on the left of displayed area, change the SW581 position to the CRT side If raster has approached on the right of displayed area, change the SW581 position to the VR581 side.
6) Adjust VR581 so that the distance between the bezel and raster edge is as follows.

$$| XL_{eft} - XR_{ight} | \leq 1.0 \text{ mm}$$

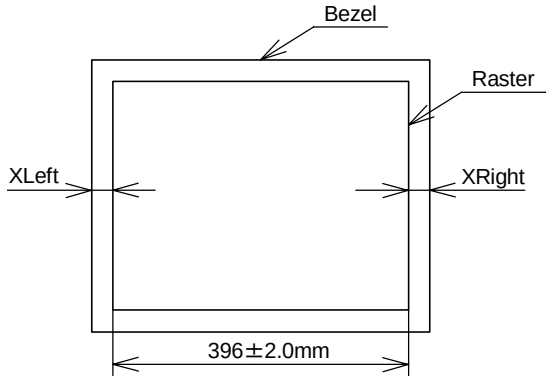


Fig 1-1 Horizontal Raster Centering

1-2. Vertical Raster Position Signal: No. 29 (V.RASTER) All White

1) Receive signal 29.

2) Menu (S), TAG2 data on "V.LINEARITY" are 90, and it confirms that data on "V.LIN.BALANCE" are 128.

* When data are not 90 and 128, Open TAG2 "V.LINEARITY" and TAG2 "V.LIN.BALANCE", and set up data. Open Menu (S), TAG2 "H.SIZE" and adjust "+" SW so that the vertical raster size is 297±3.0 mm.

3) Open Menu (S), TAG 2 "V.RASTER CENTER" and push "RESET" SW.

4) Adjust the vertical raster and the space of the edge as listed below by switch. (Fig 1-2 reference)

$|Ytop - Ybottom| \leq 1.0mm$

5) Push "RESET" SW.

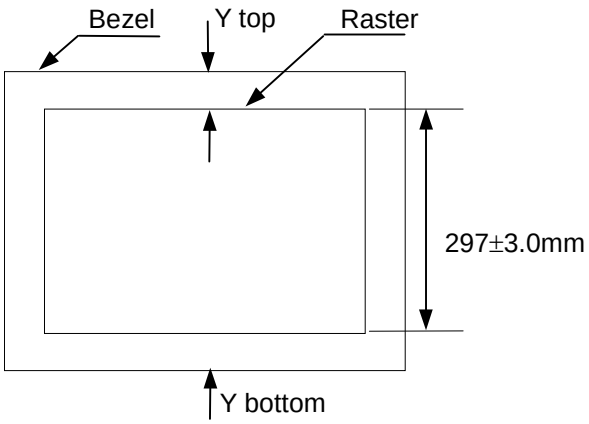


Fig 1-2 Vertical Raster Centering

2. Linearity Adjustment

2-1. Horizontal Linearity Adjustment Signal: No. 17 (1024*768@75Hz)
Cross hatch pattern
Signal: No. 23 (1600*1200@85Hz)
Cross hatch pattern

* Hereunder integrate is done when value of control former "H.LINEARITY 1:60" and "H.LINEARITY 2:180" come off the value of standardized.

1) Receive signal 23.
2) Open Menu (S), TAG2 "H.POSITION" and adjust "+", "-" SW so that the picture is centered with in the screen.
3) Open Menu (S), TAG2 "H.SIZE" and adjust "+" SW so that the horizontal size is 396±3 mm. If not able to set horizontal size, open Menu (S), TAG1 "H.SIZE MAX 2", adjust the horizontal size is 396 mm. After, Data on "H.SIZE" adjusted to the maximum (255).
4) Open Menu (S), TAG1 "H.LINEARITY 2" and adjusted so that the horizontal direction width of the second square may become the same from both ends of the screen.
Note: When a OSM Menu is hidden temporarily for picture adjustment, push "PROCEED " SW once to display OSM Menu.
5) Receive signal 17.
6) Open Menu (S), TAG2 "H.POSITION" and adjust "+", "-" SW so that the picture is centered with in the screen.
7) Open Menu (S), TAG2 "H.SIZE" and adjust "+" SW so that the horizontal size is 396±3 mm. If not able to set horizontal size, open Menu (S), TAG1 "H.SIZE MAX 2", adjust the horizontal size is 396 mm. After, Data on "H.SIZE" adjusted to the maximum (255).
8) Open Menu (S), TAG1 "H.LINEARITY 1" and adjusted so that the horizontal direction width of the second square may become the same from both ends of the screen.
Note: When a OSM Menu is hidden temporarily for picture adjustment, push "PROCEED " SW once to display OSM Menu.
9) Push "EXIT" SW.

2-2. Vertical Linearity Adjustment Signal: No. 22 (1600*1200@75Hz)
Cross hatch pattern

1) Receive signal 22.
2) Open Menu (S), TAG2 "V.POSITION" and adjust "+", "-" SW so that the picture is centered with in the screen.
3) Open Menu (S), TAG2 "V.SIZE" and adjust "+" SW so that the vertical size is 297±3 mm. If not able to set vertical size, open Menu (S), TAG2 "V.SIZE MAX", adjust the vertical size is 297±3 mm. After open Menu (S), TAG2 "V.SIZE" so that the data is max (255).
4) Open Menu (S), TAG2 "V.LINEARITY" and adjust "+", "-" SW to make size of top square and bottom square on the screen equal vertically.
Note: When a OSM Menu is hidden temporarily for picture adjustment, push "PROCEED " SW once to display OSM Menu.
5) Open Menu (S) TAG2 "V.LIN.BALANCE" and adjust "+", "-" SW to make size of top square and bottom square on the screen equal vertically.
6) Open Menu (S) TAG2 "V.LINEARITY" again and adjust "+", "-" SW to make size of top square and center square on the screen equal vertically.
7) Make sure that the linearity of top, center, and bottom on the screen are under ±3%.
8) Push "EXIT" SW.

3. Horizontal / Vertical Maximum Size Adjustment

3-1. Horizontal Maximum Size Adjustment Signal: No. 13 (MAC832*624) All white
Signal: No. 35 (H.SIZE) All white

1) Receive signal 13.
2) Open Menu (S), TAG2 "V.SIZE" and adjust "+", "-" SW so that the vertical size is 297±5 mm.
If not able to set vertical size, open Menu (S), TAG2 "V.SIZE MAX", adjust the vertical size.
And open Menu (S), TAG2 "V.SIZE" and adjust vertical size.
3) Open Menu (S), TAG3 "IN / OUT" and adjust "+", "-" SW to correct side pincushion distortion.
4) Open Menu (S), TAG1 "H.SIZE MAX.1", push “RESET”SW and make sure that "H.SIZE MAX.1" is set to 1.
5) Open Menu (S), TAG1 "H.SIZE MAX.1", and adjust "+", "-" SW so that video horizontal size may become full with the bezel.
6) Receive signal 35.
7) Open Menu (S), TAG2 "H.POSITION", rough adjust so that video area may become in the center of the screen.
8) Open Menu (S), TAG1 "H.SIZE MAX. 2", and push "EXIT" SW. It confirms that data on "H.SIZE MAX.1" are 0.
9) Open Menu (S), TAG1 "H.SIZE MAX. 2", and adjust "+", "-" SW so that video horizontal size may become full with the bezel.
10) Push "EXIT" SW.

3-2. Vertical Maximum Size Adjustment Signal: No. 28 (V.MAX) All white

1) Receive signal 28.
2) Open Menu (S), TAG2 "V.POSITION" and adjust "+", "-" SW so that the picture is centered in the screen.
3) Open Menu (S), TAG3 "V.SIZE MAX", push “RESET”SW and adjust "+", "-" SW so that the vertical size is 297±3 mm.
4) Push "EXIT" SW.

4. Deflection Distortion Adjustment

Environment: Adjustment Magnetic Field by three dimension magnetic field system.

Turn the CRT face to east and degauss the monitor using an external degaussing coil.

*When distortion amount is confirmed in the hereunder adjusted, It is made the condition that items of the menu tag 3 or 4 is select, or PROCEED is used in the condition that items is select, and turn off condition the OSM.

*After 4-1 section and 4-2 section are adjusted, Redo adjusts 4-3 sections to 4-8 sections in the case of the manual adjustment. When distortion left at the top-bottom corner, the adjusted of 4-9 section is done by this adjustment. 4-10 section is confirmed at the end.

4-1. Horizontal / Vertical Size Rough Adjustment Signal: No. 33 (788*1200@75Hz) All white

1) Open Menu (S), TAG2 "H.POSITION", "V.POSITION", "H.SIZE", "V.SIZE" and adjust the screen size to the following values.

Horizontal Size: 396 mm±3 mm

Vertical Size: 297 mm±3 mm

Horizontal Picture Position: | Xleft - XRight | ≤ 3.0 mm

Vertical Picture Position: | XTop - XBottom | ≤ 2.0 mm

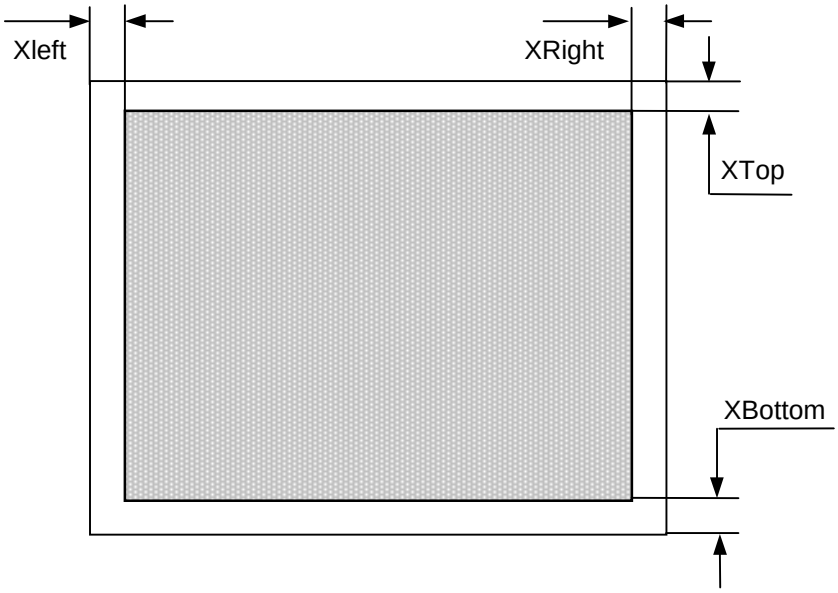


Fig 4-1 Screen Size Rough Adjustment

4-2. Picture Tilt Adjustment Signal: No. 33 (788*1200@75Hz) Cross Hatch Pattern

1) Receive signal 33.
2) Open Menu (S) TAG3 "ROTATE" and make sure that initial value of adjustment data is "128".
3) Turn the CRT face to east and degauss the monitor using an external degaussing coil.
4) Make sure that the picture tilt meets the following specification.

   $X \leq \pm$ 2.0 mm

   If out of specification, correct CRT assembly.
5) Open Menu (S) TAG3 "ROTATE" and make sure that the picture is tilted as follows by "+", "-" SW.

   "-" SW: counterclockwise

   "+" SW: clockwise
6) Open Menu (S) TAG3 "ROTATE" and adjust "+", "-" SW so that the picture tilt meets the following standards. The maximum correction is $\pm$1.0mm.

   $X \leq \pm$ 1.0 mm
7) Push "EXIT" SW.

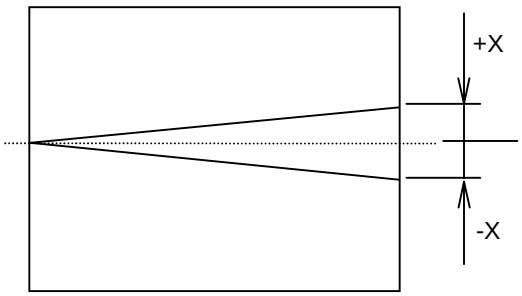


Fig 4-2 Picture Tilt

4-3. Side Pincushion Balance Adjustment Signal: No. 33 (788*1200@75Hz) All white

1) Open Menu (S), TAG3 "SIDE PIN BAL".

   Adjust "+", "-" SW so that the difference of X_{Sl} and X_{Sr} is equal (maximum 1.0 mm).

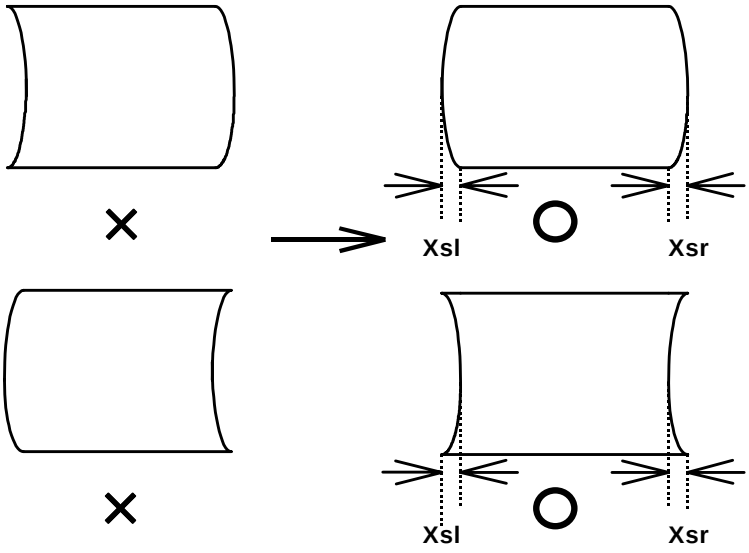


Fig 4-3 Side Pincushion Balance

4-4. Side Pincushion Adjustment Signal: No. 33 (788*1200@75Hz) All white

1) Open Menu (S), TAG3 "SIDE PIN".
Adjust "+", "-" SW so that the side pincushion distortion is small (maximum ± 0.5 mm).

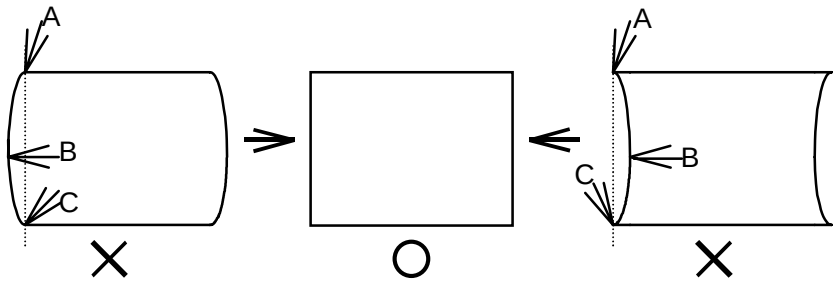


Fig 4-4 Side Pincushion

4-5. Trapezoid Distortion Adjustment Signal: No. 33 (788*1200@75Hz) All white

1) Open Menu (S), TAG3 "ALIGN".
Adjust "+", "-" SW so that the Trapezoid Distortion is equal to X**top** and X**btm**. (| X**top** - X**btm** | ≤ 1.0 mm)

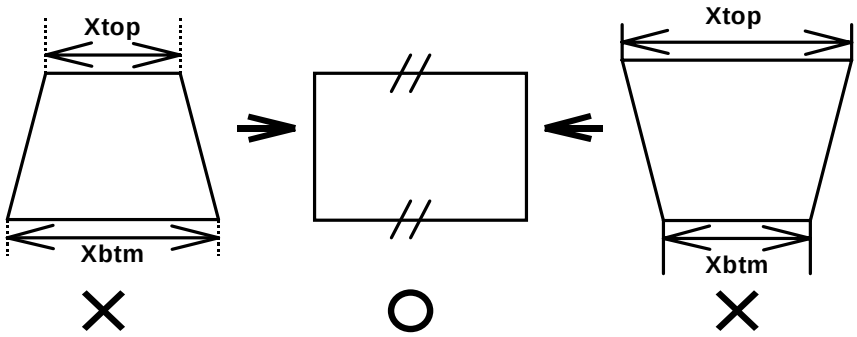


Fig 4-5 Trapezoid Distortion

4-6. Parallelogram Distortion Adjustment Signal: No. 33 (788*1200@75Hz) All white

1) Open Menu (S), TAG3 "TILT". Adjust "+", "-" SW so that the vertical line and horizontal line at the screen's center fall at right angles. (maximum 90° ± 0.5°)

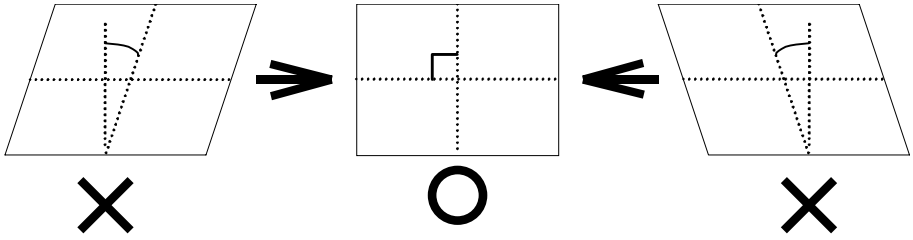


Fig 4-6 Parallelogram Distortion

4-7. Horizontal W-wave Distortion Adjustment Signal: No. 33 (788*1200@75Hz) All white

1) Open Menu (S), TAG3 " SIDE WING ".

Adjust "+", "-" SW so that the side vertical line is about straight. (maximum ± 0.5 mm)

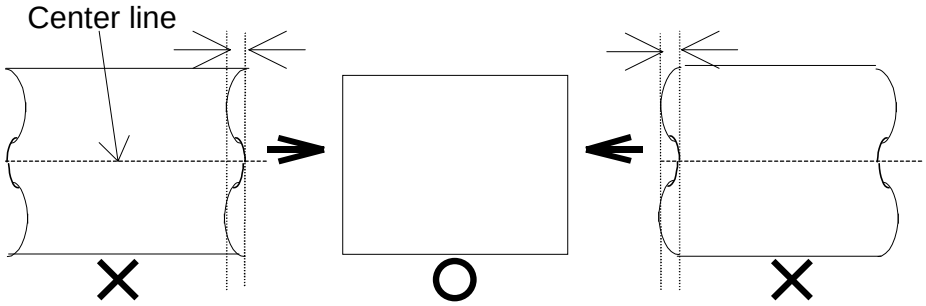


Fig 4-7 Horizontal W-wave Distortion

4-8. Vertical S-wave Distortion Adjustment Signal No. 33 (788*1200@75Hz) All white

1) Open Menu (S), TAG3 "S.WAVE".

Adjust "+", "-" SW so that the side vertical line is about straight. (maximum ± 0.5 mm)

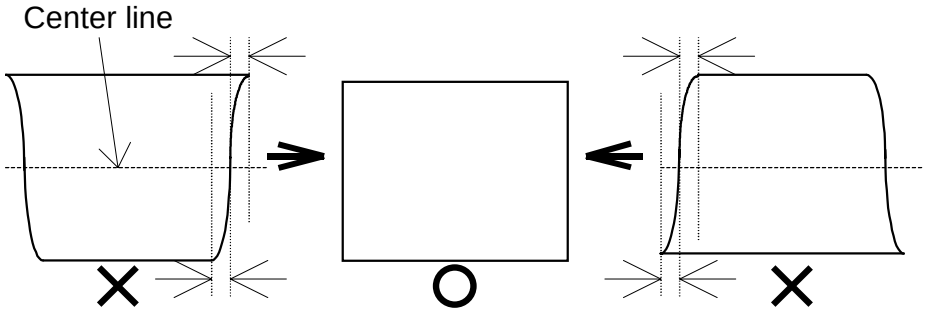


Fig 4-8 Vertical S-wave Distortion

If Trapezoid Distortion is out of specification, repeat adjustment step 4-5.

It implements this adjustment in case of the following Undulation distortion.

Undulation is a directional difference of tilt at AB and DE.

Following figures (I) and (II) are example.

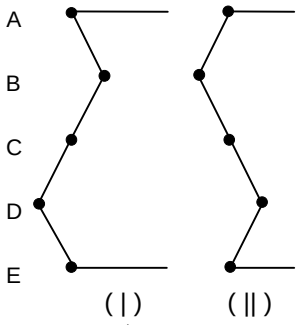


Fig 4-9 Vertical S-wave Distortion Definition

4-9. Corner Distortion Adjustment Signal: No. 33 (788*1200@75Hz) All white

Do this integrate when distortion is adjust in the top or the bottom after the integrate to 4-8 sections.

4-9-1. Top Corner Distortion Adjustment

1) Open Menu (S), TAG4 "CORNER TOP".

Adjust "+", "-" SW so that the top corner forms a right angle. (maximum ±1.0 mm)

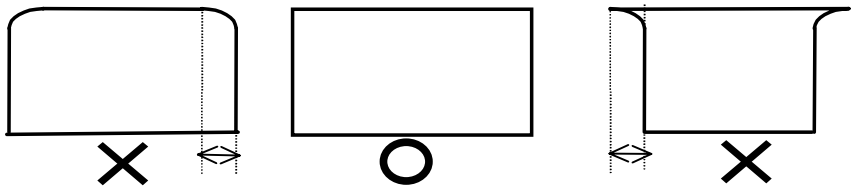


Fig 4-10 Top Corner Distortion

4-9-2. Bottom Corner Distortion Adjustment

1) Open Menu(S), TAG4 "CORNER BOTTOM".

Adjust "+", "-" SW so that the bottom corner forms a right angle. (maximum ±1.0 mm)

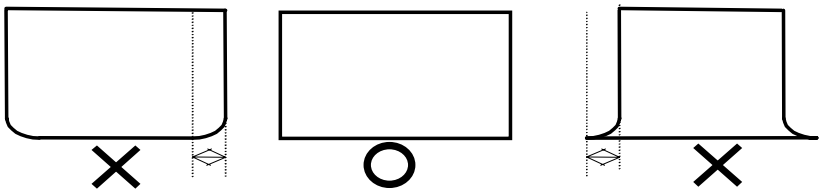


Fig 4-11 Bottom Corner Distortion

4-9-3. Top Corner Balance Adjustment

1) Open Menu(S), TAG4 "CORNER TOP BAL"

.Adjust "+", "-" SW so that the top corner forms a right angle. (maximum ±1.0mm)

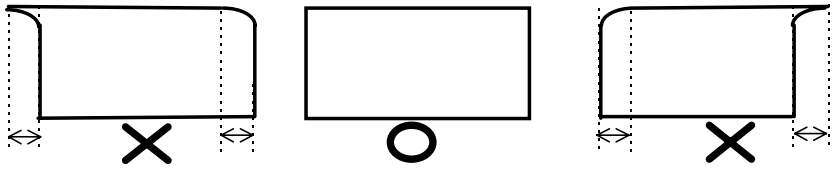


Fig 4-12 Top Corner Balance

4-9-4 Bottom Corner Balance Adjustment

1) Open Menu (S), TAG4 "CORNER BOTTOM BAL".

Adjust "+", "-" SW so that the bottom corner forms a right angle. (maximum ±1.0 mm)

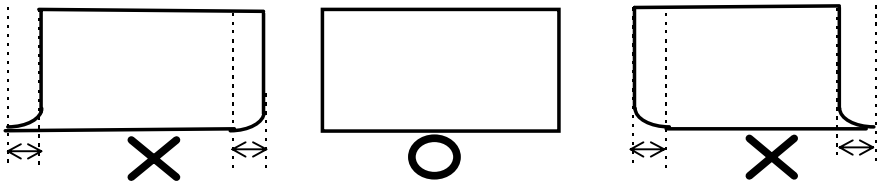


Fig 4-13 Bottom Corner Balance

4-10. Overall Distortion Adjustment Signal: No. 33 (788*1200@75Hz) All white

1) Confirm that adjustment on steps 4-2 to 4-9 meets the specifications.

2) If undulating, re-adjustment each distortion adjustment.

Undulation is a directional difference of tilt at either AC and CE or both.

Following figures (I) and (II) are example. AB and BC, CD and DE are the direction of tilt.

Undulated correction is the same direction of tilt at AB and BC, CD and DE.

Following figures (III) and (IV) are example. In this state, each adjustment standard must be met.

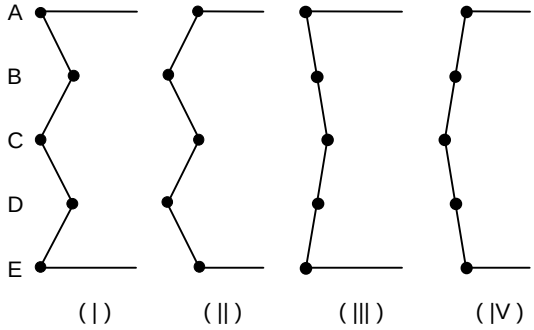


Fig 4-14 Undulated Definition

5. Preset Picture Size and Position Adjustment

Signal: No. 3 (VGA480)
No. 6 (MAC 640*480)
No.12 (VESA 640*480@85Hz)
No.13 (MAC 832*624)
No.14 (800*600@85Hz)
No.17 (1024*768@75Hz)
No.21 (1280*1024@75Hz)
No.22 (1600*1200@75Hz)
No.23 (1600*1200@85Hz)
No.32 (1280*1024@85Hz)

Video: All White

1) Receive signal 3.

2) Open Menu (S), TAG2 "H.POSITION", "V.POSITION", "H.SIZE", "V.SIZE".

3) Adjust the picture size and position as listed below by "+", "-" SW.

Picture size

H: 396 ± 1.0 mm

V: 297 ± 1.0 mm

Picture Position

H: $| XLeft - XRight | \leq 1.0$ mm

V: $| XTop - XBottom | \leq 1.0$ mm

4) Push "EXIT" SW.

5) Receive the next signal and repeat steps 2) - 4).

Note: Before receiving the next signal, always push "EXIT" SW to store adjustments.

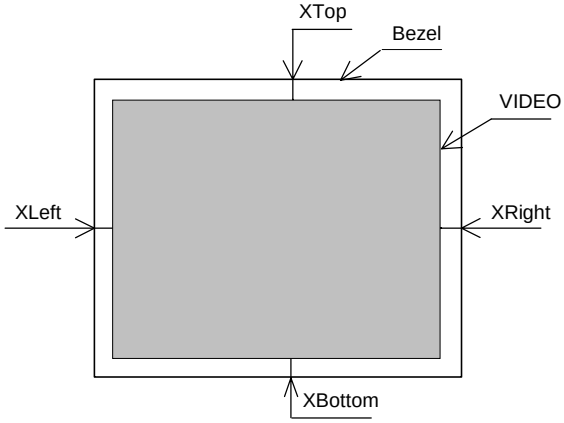


Fig 5-1 Picture Position

6) For the signals below, picture size and position are calculated from above adjustment data and data are written into EEPROM.

Preset Signal:

No. 1 (VGA350)	No.10 (XGA)
No. 2 (VGA400)	No.11 (VESA800*600@75Hz)
No. 4 (640*400@70Hz)	No.15 (1024*768@70Hz)
No. 5 (800*600@60Hz)	No.16 (1280*1024@60Hz)
No. 7 (VESA350@85Hz)	No.18 (Mac1152*870)
No. 8 (VESA400@85Hz)	No.19 (1024*768@85Hz)
No. 9 (VESA640*480@75Hz)	

USER Signal:

USER1 (PC98 1120*750(I))	USER15 (800*600@120Hz)
USER2 (VESA 800*600@56Hz)	USER16 (640*480@160Hz)
USER3 (VESA 1024*768@60Hz)	USER17 (VESA 1920*1440@60Hz)
USER4 (VESA 800*600@72Hz)	USER18 (1600*1200@70Hz)
USER5 (1120*750@60Hz)	USER19 (800*600@140Hz)
USER6 (640*480@100Hz)	USER20 (VESA 1792*1344@75Hz)
USER7 (XGA-2 1024*768@75Hz)	USER21 (VESA 1600*1200@80Hz)
USER8 (800*600@100Hz)	USER22 (1024*768@120Hz)
USER9 (640*480@120Hz)	USER23 (800*600@160Hz)
USER10 (640*480@140Hz)	USER24 (VESA 1920*1440@75Hz)
USER11 (VESA 1600*1200@60Hz)	USER25(VESA 1792*1344@85)
USER12 (1280*1024@70Hz)	USER26 (VESA 2048*1536@80Hz)
USER13 (1152*864@85Hz)	USER27 (VESA 1920*1440@85Hz)
USER14 (1024*768@100Hz)	

6. Video Amplitude Adjustment

6-1. Settings Signal: No. 23 (1600*1200@85Hz) All White

NOTE: Degauss the monitor using an external degaussing coil.

1) Confirm that the video signal of generator is as follows.

Video: Analog 0.7Vp-p ± 0.01V p-p (terminated 75 ohms ± 1 %)

2) Receive signal No.23 (All White), confirms that there is screen size of hereunder span.
It is adjust in menu TAG 2 (S),"H.SIZE", "V.SIZE", "H.POSITION", "V.POSITION" in the case as the outside of the span.

Horizontal Size : 396±3mm
Vertical Size : 297±3mm
Horizontal picture position: |XLeft - Xright | ≤ 3.0mm
Vertical picture position : |Xtop - Xbottom | ≤ 3.0mm

3) Open Menu (S), TAG 7,TAG 8,TAG 9,TAG A, TAG D and make sure that the following values.

Menu (S), TAG 7
GAIN : 200
R GAIN : 200
G GAIN : 200
B GAIN : 200
OSM COLOR GAIN:5

Menu (S), TAG 8
SUB BIAS : 255
R BIAS : 0
G BIAS : 0
B BIAS : 0

Menu (S), TAG 9
G SUB BRIGHT : 150
B SUB BRIGHT : 150
R SUB BRIGHT : 150

Menu (S), TAG A
COLOR PRESET : 1(9300K)
R COLOR GAIN : 255
G COLOR GAIN : 255
B COLOR GAIN : 255
CONT.MAX.ADJ. : 150

Menu (S), TAG D
CONTRAST PRESET: 150

6-2. Video Amplitude Signal: No.23 (1600*1200@85Hz) Window Pattern
(H:33% V:33%)

1) Receive signal 23.
2) Open Menu (S), TAG7.
3) Adjust "+", "-" SW so that video amplitude at TP-R (R GAIN) on the CRT PWB is set to 45 Vp-p (+0V/ -1V).
4) When the indicated value of the video amplitude is not 45 Vp-p(+0V/ -1V) with Gain data maximum, increase the R Gain values.
5) Adjust "+", "-" SW so that video amplitude at TP-G (G GAIN) ,TP-B (B GAIN) on the CRT PWB is set to 45 Vp-p(+0V/ -1V)
6) Push "EXIT" SW

※ When adjusting video amplitude, move cursor to desired function and push PROCEED button to hide the OSM menu. Adjustment can be made with OSM menu hidden. OSM menu must be hidden since its amplitude will appear on the wave form.

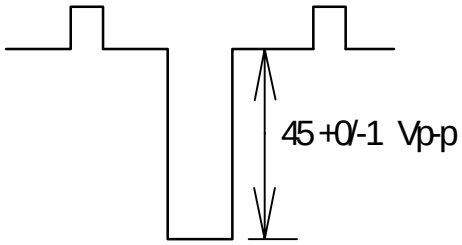


Fig 6-1 Wave form of RK, GK, BK

6-3. OSM Gain Adjustment Signal: No.23 (1600*1200@85Hz) All black

1) Receive signal 23.
2) Open Menu (S), TAG7 “OSM COLOR GAIN”.
3) Adjust “+”, “-“ SW so that OSM video amplitude at TP-G on the CRT PWB is set to 31 (±4) Vp-p.
4) Push "EXIT" SW.

6-4. Cut off Adjustment Signal: No.23 (1600*1200@85Hz) All black

1) Receive signal 23 All black
2) Open Menu (S), TAG8 "SUB BIAS" and push “RESET” SW.
   Note: Do not touch a front panel key and do not come out from “SUB BIAS” since a picture can not be seen.
3) (SAFTY) Connect the DVM with a high voltage probe at TP-G2 on the CRT PWB and adjust SCREEN VR to obtain 700 Vdc ± 5 Vdc. (Use a high voltmeter whose maximum voltage is more than 1.5kV and input resistance is more than 1000 MΩ.)
4) Set 00 channel x, y, Y modes of color analyzer CA-100 and make sure that the following values are preset.
   x = 0.273
   y = 0.300
   Y = 0.2 cd/㎡
5) Set analyzer mode at color analyzer.
6) Open Menu (S), TAG8 " SUB BIAS " and adjust until raster appears with “+” and “-“ SW.
   The color that appears first is the reference color.
   Adjust “+”,”-“SW so that its color analyzer indicated value is 20-80.
   If color analyzer does not indicate 20-80, adjust “SUB BIAS” 255 and go to (7).
   Then reference color is anything OK.
7) Open Menu (S), TAG8 and adjust the reference color bias so that its analyzer indicated value is 90-110.
8) Open Menu (S), TAG8 and adjust the other color biases so that its analyzer indicated value is 90-110.
9) When the indicated value of the reference color is over 110, repeat steps (7) to (8) so that it is 90-110.
10) Close menu.

6-5. Contrast Tracking Adjustment Signal: No.23 (1600*1200@85Hz)
Window Pattern (H: 33% V:33%)

1) Receive Signal 23.
2) Open Menu (S), TAG8 “CONT MAX/MIN”. Adjust "+" SW so that the contrast is max.
3) Setting modes x, y, Y at the color analyzer, measures the window color temperature. This measurement determines x=x1, y=y1.
4) Open Menu (S), TAG8 “CONT MAX/MIN”. Adjust "-" SW so that the contrast is min.
5) Measure the window color temperature. This measurement determines x=x2, y=y2.
6) Open Menu(S), TAG8 “G BIAS”, ”R BIAS”, ”B BIAS” and make sure that the window color temperature are the following values :
   x2 = x1 ± 0.003 y2 = y1 ± 0.003
7) Open Menu (S), TAG8 “CONT MAX/MIN”. Adjust "+" SW so that the contrast is max.
8) Measure the window color and confirm that the readings are the following values :
   x1 = x2 ± 0.003 y1 = y2 ± 0.003.
   If not, repeat items 3) to 8).
9) Push "EXIT" SW twice.

6-6. Brightness Tracking Adjustment Signal: No.23 (1600*1200@85Hz) All black

1) Receive Signal 23.
2) Set modes x, y, Y at color analyzer.
3) Open Menu (S), TAG9 “G SUB BRIGHT”, “B SUB BRIGHT”, “R SUB BRIGHT” and push "RESET" SW. (Each figure becomes 0.)
4) Adjust "+", "-" SW so that the “G SUB BRIGHT” is 5 ± 0.5 cd/㎡.
5) Adjust “R SUB BRIGHT", "B SUB BRIGHT" and adjust "+", "-" SW so that the each color temperature measured in step 6-5.
   x = x1 ± 0.002
   y = y1 ± 0.002
6) Push "EXIT" SW.

6-7. Color Preset Adjustment Signal: No.23 (1600*1200@85Hz)
Window Pattern (H:33% V:33%)

1) Receive Signal 23.
2) Open Menu (S), TAG A and push "RESET" SW. (R/G/B COLOR GAIN value is made the early stages.)
3) Open Menu (S), TAG A, "Color Preset No.1 9300k ".
4) Open Menu (S), TAG A, and adjust "R COLOR GAIN", "G COLOR GAIN", "B COLOR GAIN" so that the color temperature is the following value. (RGB either value make become 255 at this time.)
   x = 0.283 ± 0.003
   y = 0.297 ± 0.003
5) Push "EXIT" SW.
6) Open Menu(S), TAG A, and adjust Color Presets No.2 to 5 (8200K ～ 5000K) to the following values :

COLOR PRESET No.	x	y
2(8200K)	0.290 ± 0.003	0.313 ± 0.003
3(7500K)	0.300 ± 0.003	0.315 ± 0.003
4(6500K)	0.315 ± 0.003	0.325 ± 0.003
5(5000K)	0.345 ± 0.003	0.350 ± 0.003

6-8. Maximun Brightness adjustment Signal: No.23 (1600*1200@85Hz)
Window Pattern (H:33% V:33%)

1) Receive Signal 23.
2) Open Menu (S), TAG A "Color Preset No.1 9300K ".
3) Open Menu (S), TAG A “CONT.MAX.ADJ”. Adjust to 140(+0, -5) cd/㎡ if the “window brightness” is over 140cd/㎡.
4) Open Menu (S), TAG D “CONTRAST PRESET” and push "RESET" SW.

6-9.Contrast preset adjustment **(B version only)**
Signal: No.23 (1600*1200@85Hz) Window Pattern
(H:33% V:33%)

1) Receive Signal 23.
2) Open Menu (S), TAG D “CONTRAST PRESET”.
3) Adjust "+", "-" SW so that the “window brightness” is 80 to 95 cd/㎡.

7. Focus Adjustment

Signal: No.23 (1600*1200@85Hz) Window Pattern (H:33% V:33%)
No.31(1600*1200@60Hz)Cross Hatch Pattern " ∃ " Character
No.33(788*1200@75Hz) Cross Hatch Pattern
PC Excel Focus Check Pattern *(1600*1200@85Hz)

*PC Focus Check Pattern
Video Board: Millennium ||
Application: Excel (Microsoft)
Font: Arial
Font Size: 8
Character: ##&&%%$$##

※ After maximum horizontal amplitude adjustment, maximum vertical amplitude adjustment, and video adjustment are completed, perform this focus adjustment.
For steps of 8) , 9), 14), 15), adjust it with signal input through BNC using signal generator VG-819 or alternate.

※ "CONTRAST" of the user menu and "BRIGHTNESS" are set up.

BNC input	: CONTRAST - PRESET	BRIGHTNESS - PRESET
D-SUB input	: CONTRAST - MAX.	BRIGHTNESS - PRESET

As for 1)-3), it applies to A version only.

1) Receive Signal 23.
2) Open Menu (S), TAG D "CONTRAST PRESET".
3) Adjust "+", "-" SW so that the "window brightness" is 90(+0, -1) cd/㎡.
4) Receive Signal 31.
Open Menu (S), TAG2 "H.SIZE", "V.SIZE","H.POSITION", "V.POSITION".
Adjust the picture size and position as listed below by "+", "-" SW.

Picture size	H: 396±1 mm
	V: 297±1 mm
Picture Position	H: $\lvert XL_{eft} - XR_{ight} \rvert \leq 1.0$ mm
	V: $\lvert XT_{op} - XB_{ottom} \rvert \leq 1.0$ mm

5) Open Menu (S), TAG1 "V.D.FOCUS".
Adjust the voltage at TP-DF on the SW/HV PWB to obtain the following values.
The waveform of the TP-DF on the SW/HV PWB is observed, and the amplitude of parabolic-wave of the vertical period is adjusted to 185±5Vp-p with "V.D.FOCUS".
Note: When measuring Vp-p, use a 100:1 probe with capacitance of approx. 2pF.
6) Open Menu (S), TAG1 "H.D.FOCUS", and confirms that data are "210".
∗ When data are different, a " H.D.FOCUS " will be displayed, adjusted to "210".
7) "EXIT" Switch is pushed, and data is saved in the memory.
8) Receive Signal 31 (1600*1200 (60Hz) cross-hatch pattern (green monochrome)) by BNC input, Menu (U), TAG1 of "CONTRAST" and "BRIGHTNESS" are set up in " PRESET ".
9) The halo level is down with FOCUS VR F2 of FBT, and adjust so that vertical line may become thin in the center of the screen.
10) Receive Excel of PC (Focus check pattern (1280*1024@85Hz) by D-SUB input, Hereunder setting is done in the user menu.
CONRAST : MAX. BRIGHTNESS : PRESET (Menu (U), TAG1)
H.SIZE : 396mm±1mm V.SIZE : 297mm±1mm (Menu (U), TAG2)

11) It pays attention to the horizontal line of EXCEL.
A Focus is made to get fat with VR, and some double horizontal lines are displayed.
Adjust within the limits of value of VDF(±10STEP) so that the horizontal line double pallet width of 4 square of center and top and bottom may become the same.
Adjust within the limits of value of HDF(between 210±20 STEP) so that the horizontal line width of 4 cell of center and left and right may become the same.
Note: Double horizontal lines is done as the one for the center is a little opened because both differences become ambiguous when it is displayed too much. And because it becomes over-revision, it is faced a little inside at the edge of the screen.

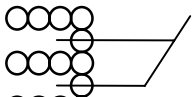
12) Adjust Focus VR F2 so that character vertical wire of EXCEL may get clear thicker.

13) Adjust Focus VR F1 so that horizontal is not double line and characters are fine on all area.

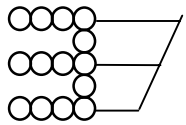
14) Receive signal 31("ヨ" character) by BNC input, and "CONTRAST" and "BRIGHTNESS" are adjusted to PRESET in the user menu.

15) Make sure that the horizontal lines of "ヨ" character white and green colors are crisp as possible in the whole screen. (It is confirmed by using a magnifying glass of 10 times.)

a) The space between horizontal lines is crisp.



b) The horizontal lines are not bold, and do not form halo



When it isn't missing, it is adjusted again about 12), the 13) clause.

16) Receive signal 33. (Cross-hatch,Red/Green/Blue each color) Make sure halo is within the specification.
Vertical line halo: halo and core of red and blue color <= 9
halo and core of green color <= 8
Horizontal line halo: judged to be level (core / halo: 1/1)

17) Open Menu (S), TAG D “CONTRAST PRESET” and push “RESET” SW.(it applies to A/R/AS version only)

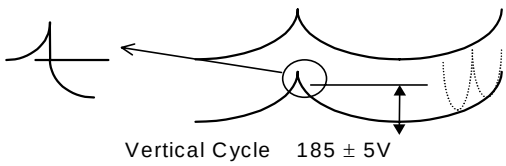


Fig 7-1 Dynamic Focus Wave Form

8. Purity Signal: No. 22 (1600*1200@75Hz) All green

Adjustment Magnetic Field by three dimension magnetic field system.

Setting of the Landing meter (KLD-01 made by KAMAYA)

Volt: 2.0V Time: 50ms GAIN: 7

※ Adjust this monitor after a minimum of 90 minutes to allow unit to reach ambient operating temperature. (Use the Self Test screen. Refer item 7-5-3. About Self Test.)

1) Turn the CRT face to east, and the outside degauss is done, and demagnetization is done again in the Degauss power source.
   The degauss of the outside is conducted in the front face, both sides, the base, the top panel.
   But, degauss is unnecessary for the chassis of the part of aluminum.
2) Receive signal 22(all green) and make sure that the following specifications are satisfied.

Picture Size	H: 396mm±1.0mm
	V: 297mm±1.0mm
Picture Position	H: | XLeft - Xright | ≤ 1.0mm
	V: | Xtop - Xbottom | ≤ 1.0mm

3) Open Menu (S), TAG 5 “EMF TOP RIGHT”.
4) The four corners (Within 3*3cm) of the screen (Fig 8-1) are measured by the Landing meter, and the value of X when the value of Y was made 0 is measured.
   When measured value is more than ±3%, Adjust "+","-" SW so that items of each four corners the following standards.
   -3% ≤ × ≤ +3%
5) Measure that the items of each four corners are -3% ≤ × ≤ +3%
   When it is not in the adjustment standard, 4), 5) clause are repeated.

Top Right: EMF TOP RIGHT Top Left: EMF TOP LEFT
Bottom Right: EMF BOTTOM RIGHT Bottom Left: EMF BOTTOM LEFT

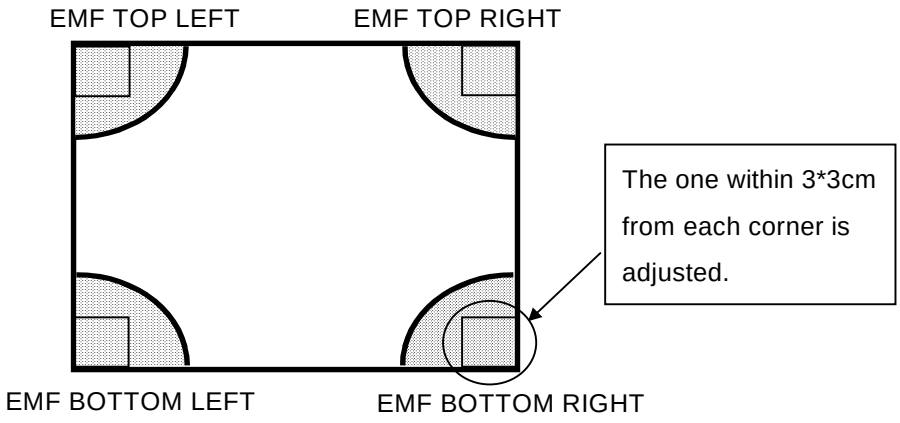


Fig 8-1 Landing measurement point

Don't use "GLOBAL SYNC" when you adjust it.

9. Convergence Adjustment Signal: No.33(788*1200@75Hz)
Cross Hatch Pattern and frame Pattern

9-1. Settings

1) Receive Signal 33 (Cross Hatch Pattern and frame Pattern).
Adjust the H / V an interval of Cross Hatch Pattern to the following values, and Cross Hatch Pattern consist of the 15 vertical lines and the 11 horizontal lines is displayed.
H interval: 54 dot
V interval: 112 line

2) It confirms that screen amplitude and screen positions are following values.

Screen amplitude	H : 396mm±1.0mm
	V : 297mm±1.0mm
Screen position	H : | Xleft - Xright | ≦ 1.0mm
	V : | Xtop - Xbottom | ≦ 1.0mm

3) Open Menu (S), TAG C, and make sure the data for each Item.

H. CONVER SAW T	: 127
H. CONVER PARA T	: 128
H. CONVER SAW B	: 128
H. CONVER PARA B	: 128
V. CONVER SAW T	: 127
V. CONVER PARA T	: 128
V. CONVER SAW B	: 128
V. CONVER PARA B	: 128

If not, Select item and then press RESET SW.

4) Open Menu (S), TAG B, and highlight TAG B.
Push and hold “RESET” SW and push “▲” SW at the same time.
(4H, 4V data on every COLUMN / ROW will be reset.)

5) Set a Convergence Meter.

REFERENCE COLOR	: G
S.P. (STRIPE PITCH)	: 0.25±0.02mm

9-2. Static Convergence Adjustment

Auto EMF function must be ON.
When each Convergence item is selected, Auto EMF will be worked and LED will be changed to orange.
While measuring convergence, hide OSM with “PROCEED” SW.

1) Receive Signal 33 White (Cross Hatch Pattern).
Measure the static convergence at center.
Spec : x , y ≦ 0.05mm

2) Receive Signal 33 Red and Blue (Cross Hatch Pattern).
If misconvergence at center is 0.21mm or greater, adjust 4-pole magnet on CPM to get 0.21mm or less.
If misconvergence at center is 0.20mm or less, adjust Menu (S), TAG B “H.S.CONVER” , “V.S.CONVER” to get the spec.

3) Receive Signal 33 White (Cross Hatch Pattern).
Adjust 6-pole magnet on CPM to get spec.

4) Receive Signal 33 Red and Blue again (Cross Hatch Pattern).
Adjust Menu (S), TAG B “H.S.CONVER” , “V.S.CONVER” to get the spec.

Adjustment limits
H.S.CONVER: 65 - 191
V.S.CONVER: 82 - 174

9-3. Dynamic Convergence Adjustment

1) Adjustment function

There are 165 blocks (ROW: 1-11,COLUMN: 1-15) on the picture where you can adjust dynamic convergence individually.

ROW (1-11)	: Adjusting cross can be selected (Top to bottom).
COLUMN (1 -15)	: Adjusting cross can be selected (Left to right).
4H	: R-B (X) convergence can be adjusted.
4V	: R-B (Y) convergence can be adjusted.

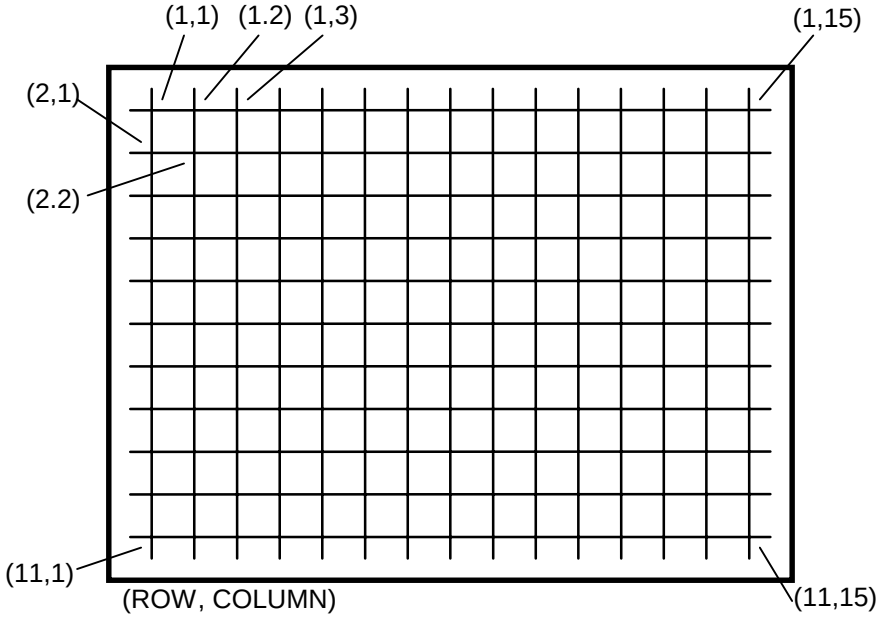


Fig 10-1 Convergence Adjustment Points

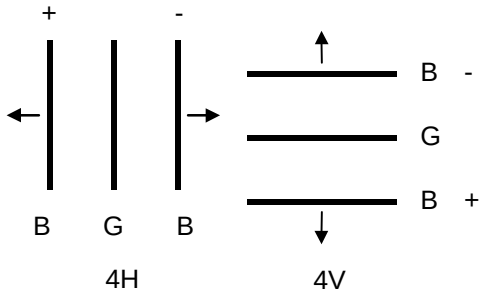


Fig 10-2 Convergence Adjustment Items

2) Menu (S), TAG B 4V Adjustment

Receive Signal 33 Red and Blue (Cross Hatch Pattern).

Adjust convergence at every COLUMN / ROW by 4V to get the spec.

3) Menu (S), TAG B 4H Adjustment

Adjust convergence at every COLUMN / ROW by 4H to get the spec.

4) Menu (S), TAG B 6H Adjustment

Receive Signal 33 White (Cross Hatch Pattern).

Adjust convergence at every COLUMN / ROW by 6H to get the spec.

5) Make sure the misconvergence at every COLUMN / ROW is within spec.

Specification : x $\leqq$ 0.25mm , y $\leqq$ 0.25mm

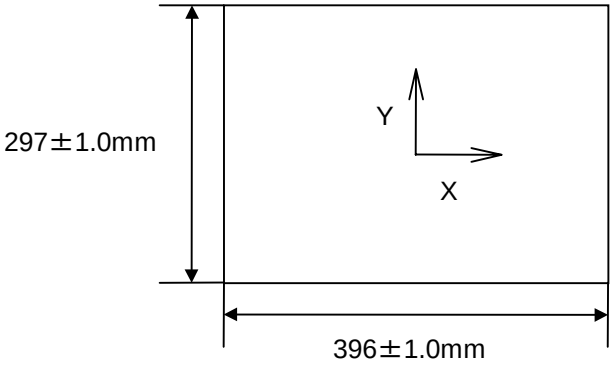


Fig 9-3 Convergence Specification

* Adjustment limits (Adjusted point data)

Between the COLUMN and next COLUMN

Difference 4H: 45 or less, 4V: 40 or less

Between the ROW and next ROW

Difference 4H: 45 or less, 4V: 40 or less

* Adjustment limits (Dynamic correction data)

H.S CONVER : 65-191 (the count of OSM number)

V.S CONVER : 82-174

H.CONVER SAW T : 95-159

H.CONVER SAW B : 95-159

V.CONVER SAW T : 95-159

V.CONVER SAW B : 95-159

* The noise will be appeared on the picture while adjusting, but it is no problem.

The jitter or the noise will be appeared by big difference between current adjusted data and previous adjusted data.

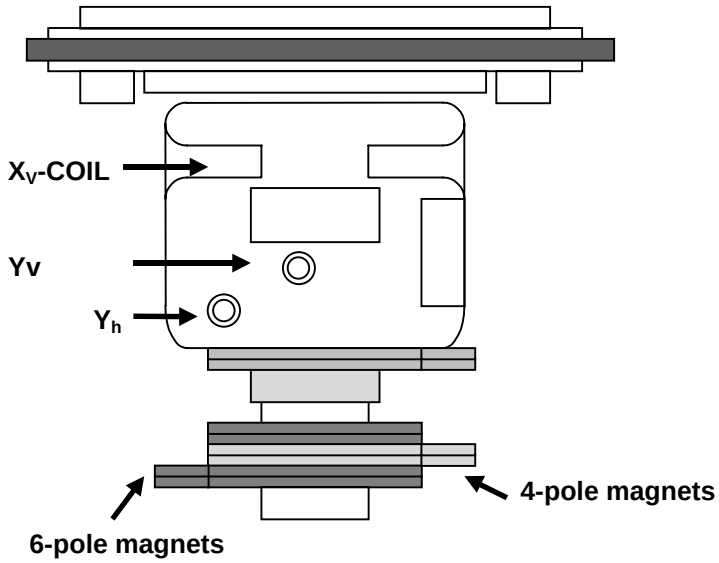


Fig 9-4 The location of the VR. and Coil and magnets

10. Auto Adjustment　　Signal: No. 3 (VGA480) All White
Signal: No. 23 (1600*1200@85Hz) All White

When this adjustment is done, picture size, linearity, picture position, picture deformation, video adjustment are to be finished.

1) Receive signal 3 (VGA480) All White, and confirm that the picture size and picture position is as follows.
Open Menu (S), TAG D "AUTO ADJUT L", and push "Proceed" SW (Adjustment data is written in the Monitor at this time).
2) Receive signal 23 (1600*1200@85Hz) All White, and confirm that the picture size and picture position is as follows.
Open Menu (S), TAG D "AUTO ADJUT H", and push "Proceed" SW (Adjustment data is written in the Monitor at this time).

Picture size	H: 396±1mm V: 297±1mm
Picture position	H: | Xleft - Xright | ≤ 1.0mm V: | Xtop - Xbottom | ≤ 1.0mm

[D] Reference

1. Adjustment Signal

NO.	Signal Name	SYNC Type	SYNC Polarity(H/V)
1	VGA 350	Separate	Pos/Neg
2	VGA 400	Separate	Neg/Pos
3	VGA 480	Separate	Neg/Neg
4	640*400@70Hz	Separate	Neg/Neg
5	800*600@60Hz	Separate	Pos/Pos
6	MAC 640*480	Composite + Sync on G	Neg/Neg
7	VESA 350@85Hz	Separate	Pos/Neg
8	VESA 400@85Hz	Separate	Neg/Pos
9	VESA 640*480@75Hz	Separate	Neg/Neg
10	XGA	Separate	Pos/Pos
11	VESA 800*600@75Hz	Separate	Pos/Pos
12	VESA 640*480@85Hz	Separate	Neg/Neg
13	MAC 832*624	Composite + Sync on G	Neg/Neg
14	800*600@85Hz	Separate	Pos/Pos
15	1024*768@70Hz	Separate	Neg/Neg
16	1280*1024@60Hz	Separate	Pos/Pos
17	1024*768@75Hz	Separate	Pos/Pos
18	MAC 1152*870	Composite + Sync on G	Neg/Neg
19	1024*768@85Hz	Separate	Pos/Pos
20	1280*1024@70Hz	Sync on G	
21	1280*1024@75Hz	Separate	Pos/Pos
22	1600*1200@75Hz	Separate	Pos/Pos
23	1600*1200@85Hz	Separate	Pos/Pos
25	H.HOLD 1	Composite	Pos/Pos *1
28	V.MAX	Separate	Neg/Neg
29	V.RASTER	Separate	Pos/Pos
30	EDID	Separate	Neg/Neg
31	1600*1200@60Hz	Separate	Pos/Pos
32	1280*1024@85Hz	Separate	Pos/Pos
33	788*1200@75Hz	Separate	Pos/Pos
36	H.HOLD 2(130K)	Separate	Pos/Pos *1

NO.	Signal Name	SYNC Type	SYNC Polarity(H/V)
USER1	PC98 1120*750(I)	Separate	Pos/Pos
USER2	VESA 800*600@56Hz	Separate	Pos/Pos
USER3	VESA 1024*768@60Hz	Separate	Neg/Neg
USER4	VESA 800*600@72Hz	Separate	Pos/Pos
USER5	1120*750@60Hz	Separate	Neg/Neg
USER6	640*480@100Hz	Separate	Neg/Neg
USER7	XGA-2 1024*768@72Hz	Separate	Neg/Neg
USER8	800*600@100Hz	Separate	Pos/Pos
USER9	640*480@120Hz	Separate	Pos/Pos
USER10	640*480@140Hz	Separate	Neg/Neg
USER11	VESA 1600*1200@60Hz	Separate	Neg/Neg
USER12	1280*1024@70Hz	Separate	Pos/Pos
USER13	VESA 1152*864@85Hz	Separate	Pos/Pos
USER14	1024*768@100Hz	Separate	Pos/Pos
USER15	800*600@120Hz	Separate	Pos/Pos
USER16	640*480@160Hz	Separate	Neg/Neg
USER17	VESA1920*1440@60Hz	Separate	Neg/Pos
USER18	1600*1200@70Hz	Separate	Pos/Pos
USER19	800*600@140Hz	Separate	Pos/Pos
USER20	VESA1792*1344@75Hz	Separate	Pos/Pos
USER21	VESA 1600*1200@80Hz	Separate	Neg/Pos
USER22	1024*768@120Hz	Separate	Pos/Pos
USER23	800*600@160Hz	Separate	Pos/Pos
USER24	VESA1920*1440@75Hz	Separate	Pos/Pos
USER25	VESA1792*1344@85Hz	Separate	Neg/Pos
USER26	VESA2048*1536@80Hz	Separate	Neg/Pos
USER27	VESA1920*1440@85Hz	Separate	Neg/Pos

*1 When an approximate value is utilized because it is impossible to output the exact fH from the signal generator
On the 31kHz side, utilize the highest frequency signal that satisfies fH $\leqq$ 31.0kHz. On the 130kHz side, utilize the lowest frequency signal that satisfies fH $\geqq$ 130kHz. (Tolerance must be within 50Hz.) being used:

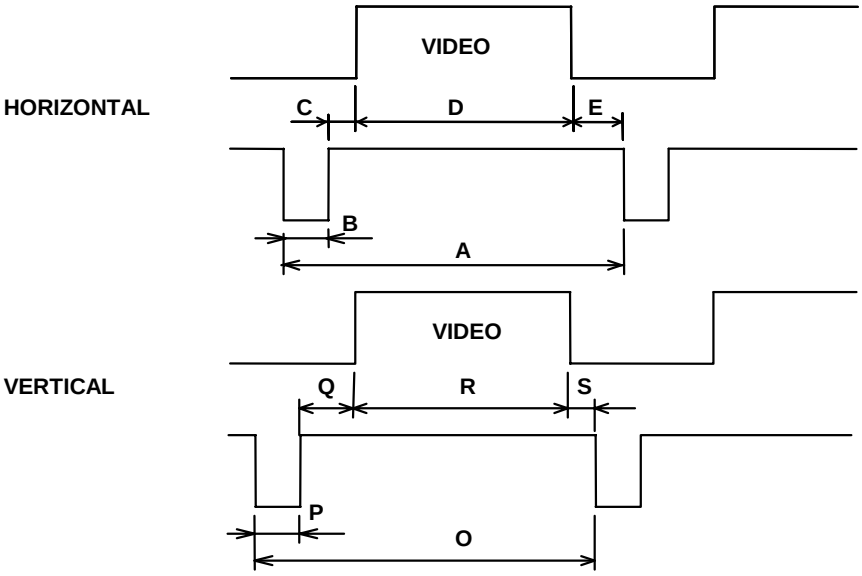
*2 Supply the sync signals output from the signal generator as follows:
H/V Composite : Supply to the set undergoing adjustment
V. SYNC only : Supply to the CA-100 color analyzer.

*3 The crosshatch pattern shall have 17 vertical lines and 13 horizontal lines.

2. Adjustment Signal timing

Signal Timing Charts

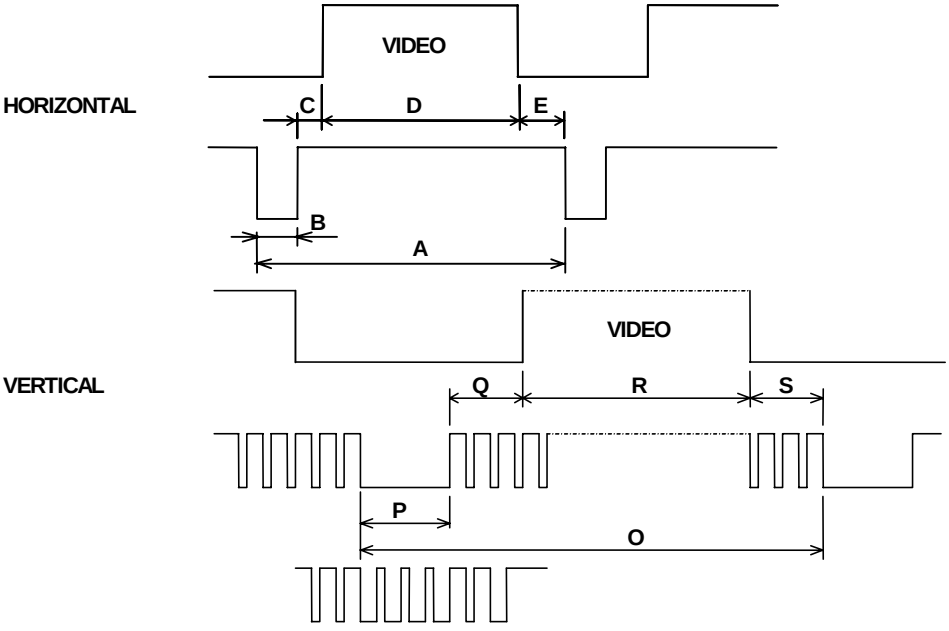
SEPARATE SYNC



A: H.Total Time
B: H.Sync Time
C: H.Back Porch
D: H.Addr Time
E: H.Front Porch

Sync Polarity: Positive/Negative

COMPOSITE SYNC



O: V.Total Time
P: V.Sync Time
Q: V.Back Porch
R: V.Addr Time
S: V.Front Porch

Sync Polarity: Positive/Negative

TIMING NAME	1 VGA350		2 VGA400		3 VGA480		4 640*400@70 Hz		5 800*600@60	
Pixel Clock		28.322 [MHz]		28.322 [MHz]		25.175 [MHz]		25.175 [MHz]		40.000 [MHz]
H.Frequency		31.469 [kHz]		31.469 [kHz]		31.469 [kHz]		31.469 [kHz]		37.879 [kHz]
V.Frequency		70.086 [Hz]		70.087 [Hz]		59.940 [Hz]		70.086 [Hz]		60.317 [Hz]
H.Tortal Time	900 [dots]	31.778 [us]	900 [dots]	31.777 [us]	800 [dots]	31.778 [us]	800 [dots]	31.778 [us]	1056 [dots]	26.400 [us]
H.Addr Time	720 [dots]	25.422 [us]	720 [dots]	25.422 [us]	640 [dots]	25.422 [us]	640 [dots]	25.422 [us]	800 [dots]	20.000 [us]
H.Blank Time	180 [dots]	6.356 [us]	180 [dots]	6.355 [us]	160 [dots]	6.356 [us]	160 [dots]	6.356 [us]	256 [dots]	6.400 [us]
H.Front Porch	18 [dots]	0.636 [us]	18 [dots]	0.636 [us]	16 [dots]	0.636 [us]	17 [dots]	0.675 [us]	40 [dots]	1.000 [us]
H.Sync Time	108 [dots]	3.813 [us]	108 [dots]	3.813 [us]	96 [dots]	3.813 [us]	64 [dots]	2.542 [us]	128 [dots]	3.200 [us]
H.Back Porch	54 [dots]	1.907 [us]	54 [dots]	1.907 [us]	48 [dots]	1.907 [us]	79 [dots]	3.138 [us]	88 [dots]	2.200 [us]
V.Tortal Time	449 [lines]	14.268 [ms]	449 [lines]	14.268 [ms]	525 [lines]	16.683 [ms]	449 [lines]	14.268 [ms]	628 [lines]	16.579 [ms]
V.Addr Time	350 [lines]	11.122 [ms]	400 [lines]	12.711 [ms]	480 [lines]	15.253 [ms]	400 [lines]	12.711 [ms]	600 [lines]	15.840 [ms]
V.Blank Time	99 [lines]	3.146 [ms]	49 [lines]	1.557 [ms]	45 [lines]	1.430 [ms]	49 [lines]	1.557 [ms]	28 [lines]	0.739 [ms]
V.Front Porch	37 [lines]	1.176 [ms]	12 [lines]	0.381 [ms]	10 [lines]	0.318 [ms]	13 [lines]	0.413 [ms]	1 [lines]	0.026 [ms]
V.Sync Time	2 [lines]	0.064 [ms]	2 [lines]	0.064 [ms]	2 [lines]	0.064 [ms]	2 [lines]	0.064 [ms]	4 [lines]	0.106 [ms]
V.Back Porch	60 [lines]	1.907 [ms]	35 [lines]	1.112 [ms]	33 [lines]	1.049 [ms]	34 [lines]	1.080 [ms]	23 [lines]	0.607 [ms]
Scan Type		Non-interlaced		Non-interlaced		Non-interlaced		Non-interlaced		Non-interlaced
H.Sync Polarity		Positive		Negative		Negative		Negative		Positive
V.Sync Polarity		Negative		Positive		Negative		Negative		Positive
		Separate		Separate		Separate		Separate		Separate

TIMING NAME	6 MAC640*480		7 VESA640*350@85Hz		8 VESA640*400@85Hz		9 VESA640*480@75Hz		10 XGA	
Pixel Clock		30.240 [MHz]		31.500 [MHz]		31.500 [MHz]		31.500 [MHz]		44.900 [MHz]
H.Frequency		35.000 [kHz]		37.861 [kHz]		37.861 [kHz]		37.500 [kHz]		35.522 [kHz]
V.Frequency		66.667 [Hz]		85.080 [Hz]		85.080 [Hz]		75.000 [Hz]		87.064 [Hz]
H.Tortal Time	864 [dots]	28.571 [us]	832 [dots]	26.413 [us]	832 [dots]	26.413 [us]	840 [dots]	26.667 [us]	1264 [dots]	29.577 [us]
H.Addr Time	640 [dots]	21.164 [us]	640 [dots]	20.317 [us]	640 [dots]	20.317 [us]	640 [dots]	20.317 [us]	1024 [dots]	22.806 [us]
H.Blank Time	224 [dots]	7.407 [us]	192 [dots]	6.095 [us]	192 [dots]	6.095 [us]	200 [dots]	6.349 [us]	240 [dots]	6.771 [us]
H.Front Porch	64 [dots]	2.116 [us]	32 [dots]	1.016 [us]	32 [dots]	1.016 [us]	16 [dots]	0.508 [us]	8 [dots]	0.535 [us]
H.Sync Time	64 [dots]	2.116 [us]	64 [dots]	2.032 [us]	64 [dots]	2.032 [us]	64 [dots]	2.032 [us]	176 [dots]	3.029 [us]
H.Back Porch	96 [dots]	3.175 [us]	96 [dots]	3.048 [us]	96 [dots]	3.048 [us]	120 [dots]	3.810 [us]	56 [dots]	3.207 [us]
V.Tortal Time	525 [lines]	15.000 [ms]	445 [lines]	11.754 [ms]	445 [lines]	11.754 [ms]	500 [lines]	13.333 [ms]	408 [lines]	23.839 [ms]
V.Addr Time	480 [lines]	13.714 [ms]	350 [lines]	9.244 [ms]	400 [lines]	10.565 [ms]	480 [lines]	12.800 [ms]	384 [lines]	22.715 [ms]
V.Blank Time	45 [lines]	1.286 [ms]	95 [lines]	2.509 [ms]	45 [lines]	1.189 [ms]	20 [lines]	0.533 [ms]	24 [lines]	1.124 [ms]
V.Front Porch	3 [lines]	0.086 [ms]	32 [lines]	0.845 [ms]	1 [lines]	0.026 [ms]	1 [lines]	0.027 [ms]	0 [lines]	0.089 [ms]
V.Sync Time	3 [lines]	0.086 [ms]	3 [lines]	0.079 [ms]	3 [lines]	0.079 [ms]	3 [lines]	0.080 [ms]	4 [lines]	0.177 [ms]
V.Back Porch	39 [lines]	1.114 [ms]	60 [lines]	1.585 [ms]	41 [lines]	1.083 [ms]	16 [lines]	0.427 [ms]	20 [lines]	0.858 [ms]
Scan Type		Non-interlaced		Non-interlaced		Non-interlaced		Non-interlaced		Interlaced
H.Sync Polarity		Negative		Positive		Negative		Negative		Positive
V.Sync Polarity		Negative		Negative		Positive		Negative		Positive
		Composit + Sync On G		Separate		Separate		Separate		Separate

TIMING NAME	11 VESA800*600@75Hz	12 VESA640*480@85Hz	13 MAC832*624	14 VESA 800*600@85Hz	15 VESA 1024*768@70Hz
Pixel Clock	49.500 [MHz]	36.000 [MHz]	57.283 [MHz]	56.250 [MHz]	75.000 [MHz]
H.Frequency	46.875 [kHz]	43.296 [kHz]	49.725 [kHz]	53.674 [kHz]	56.476 [kHz]
V.Frequency	75.000 [Hz]	85.008 [Hz]	74.550 [Hz]	85.061 [Hz]	70.069 [Hz]
H.Tortal Time	1056 [dots] 21.333 [us]	832 [dots] 23.111 [us]	1152 [dots] 20.111 [us]	1048 [dots] 18.631 [us]	1328 [dots] 17.707 [us]
H.Addr Time	800 [dots] 16.162 [us]	640 [dots] 17.778 [us]	832 [dots] 14.524 [us]	800 [dots] 14.222 [us]	1024 [dots] 13.653 [us]
H.Blank Time	256 [dots] 5.172 [us]	192 [dots] 5.333 [us]	320 [dots] 5.586 [us]	248 [dots] 4.409 [us]	304 [dots] 4.053 [us]
H.Front Porch	16 [dots] 0.323 [us]	56 [dots] 1.556 [us]	32 [dots] 0.559 [us]	32 [dots] 0.569 [us]	24 [dots] 0.320 [us]
H.Sync Time	80 [dots] 1.616 [us]	56 [dots] 1.556 [us]	64 [dots] 1.117 [us]	64 [dots] 1.138 [us]	136 [dots] 1.813 [us]
H.Back Porch	160 [dots] 3.232 [us]	80 [dots] 2.222 [us]	224 [dots] 3.910 [us]	152 [dots] 2.702 [us]	144 [dots] 1.920 [us]
V.Tortal Time	625 [lines] 13.333 [ms]	509 [lines] 11.764 [ms]	667 [lines] 13.414 [ms]	631 [lines] 11.756 [ms]	806 [lines] 14.272 [ms]
V.Addr Time	600 [lines] 12.800 [ms]	480 [lines] 11.093 [ms]	624 [lines] 12.549 [ms]	600 [lines] 11.179 [ms]	768 [lines] 13.599 [ms]
V.Blank Time	25 [lines] 0.533 [ms]	29 [lines] 0.670 [ms]	43 [lines] 0.865 [ms]	31 [lines] 0.578 [ms]	38 [lines] 0.673 [ms]
V.Front Porch	1 [lines] 0.021 [ms]	1 [lines] 0.023 [ms]	1 [lines] 0.020 [ms]	1 [lines] 0.019 [ms]	3 [lines] 0.053 [ms]
V.Sync Time	3 [lines] 0.064 [ms]	3 [lines] 0.069 [ms]	3 [lines] 0.060 [ms]	3 [lines] 0.056 [ms]	6 [lines] 0.106 [ms]
V.Back Porch	21 [lines] 0.448 [ms]	25 [lines] 0.578 [ms]	39 [lines] 0.784 [ms]	27 [lines] 0.503 [ms]	29 [lines] 0.513 [ms]
Scan Type	Non-interlaced	Non-interlaced	Non-interlaced	Non-interlaced	Non-interlaced
H.Sync Polarity	Positive	Negative	Negative	Positive	Negative
V.Sync Polarity	Positive	Negative	Negative	Positive	Negative
	Separate	Separate	Composit + Sync On G	Separate	Separate

TIMING NAME	16 VESA 1280*1024@60H	17 VESA 1024*768@75Hz	18 MAC1152*870	19 VESA 1024*768@85Hz	20 1280*1024@70Hz
Pixel Clock	108.000 [MHz]	78.750 [MHz]	100.000 [MHz]	94.500 [MHz]	127.000 [MHz]
H.Frequency	63.981 [kHz]	60.023 [kHz]	68.681 [kHz]	68.677 [kHz]	74.970 [kHz]
V.Frequency	60.020 [Hz]	75.029 [Hz]	75.062 [Hz]	84.997 [Hz]	69.870 [Hz]
H.Tortal Time	1688 [dots] 15.630 [us]	1312 [dots] 16.660 [us]	1456 [dots] 14.560 [us]	1376 [dots] 14.561 [us]	1694 [dots] 13.339 [us]
H.Addr Time	1280 [dots] 11.582 [us]	1024 [dots] 13.003 [us]	1152 [dots] 11.520 [us]	1024 [dots] 10.836 [us]	1280 [dots] 10.079 [us]
H.Blank Time	408 [dots] 3.778 [us]	288 [dots] 3.657 [us]	304 [dots] 3.040 [us]	352 [dots] 3.725 [us]	414 [dots] 3.260 [us]
H.Front Porch	48 [dots] 0.444 [us]	16 [dots] 0.203 [us]	32 [dots] 0.320 [us]	48 [dots] 0.508 [us]	30 [dots] 0.236 [us]
H.Sync Time	112 [dots] 1.037 [us]	96 [dots] 1.219 [us]	128 [dots] 1.280 [us]	96 [dots] 1.016 [us]	160 [dots] 1.260 [us]
H.Back Porch	248 [dots] 2.296 [us]	176 [dots] 2.235 [us]	144 [dots] 1.440 [us]	208 [dots] 2.201 [us]	224 [dots] 1.764 [us]
V.Tortal Time	1066 [lines] 16.661 [ms]	800 [lines] 13.328 [ms]	915 [lines] 13.322 [ms]	808 [lines] 11.765 [ms]	1073 [lines] 14.312 [ms]
V.Addr Time	1024 [lines] 16.005 [ms]	768 [lines] 12.795 [ms]	870 [lines] 12.667 [ms]	768 [lines] 11.183 [ms]	1024 [lines] 13.659 [ms]
V.Blank Time	42 [lines] 0.656 [ms]	32 [lines] 0.533 [ms]	45 [lines] 0.655 [ms]	40 [lines] 0.582 [ms]	48 [lines] 0.654 [ms]
V.Front Porch	1 [lines] 0.016 [ms]	1 [lines] 0.017 [ms]	3 [lines] 0.044 [ms]	1 [lines] 0.015 [ms]	3 [lines] 0.040 [ms]
V.Sync Time	3 [lines] 0.047 [ms]	3 [lines] 0.050 [ms]	3 [lines] 0.044 [ms]	3 [lines] 0.044 [ms]	4 [lines] 0.053 [ms]
V.Back Porch	38 [lines] 0.594 [ms]	28 [lines] 0.466 [ms]	39 [lines] 0.568 [ms]	36 [lines] 0.524 [ms]	42 [lines] 0.560 [ms]
Scan Type	Non-interlaced	Non-interlaced	Non-interlaced	Non-interlaced	Non-interlaced
H.Sync Polarity	Positive	Positive	Negative	Positive	Negative
V.Sync Polarity	Positive	Positive	Negative	Positive	Negative
	Separate	Separate	Composit + Sync On G	Separate	Sync on G

TIMING NAME	21 VESA 1280*1024@75Hz		22 VESA 1600*1200@75Hz		23 VESA 1600*1200@85Hz		24 VESA 1920*1440@75Hz		25 H.HOLD1	
Pixel Clock		135.000 [MHz]		202.500 [MHz]		229.500 [MHz]		297.000 [MHz]		27.900 [MHz]
H.Frequency		79.976 [kHz]		93.750 [kHz]		106.250 [kHz]		112.500 [kHz]		31.000 [kHz]
V.Frequency		75.025 [Hz]		75.000 [Hz]		85.000 [Hz]		75.000 [Hz]		54.963 [Hz]
H.Tortal Time	1688 [dots]	12.504 [us]	2160 [dots]	10.667 [us]	2160 [dots]	9.412 [us]	2640 [dots]	8.889 [us]	900 [dots]	32.260 [us]
H.Addr Time	1280 [dots]	9.481 [us]	1600 [dots]	7.901 [us]	1600 [dots]	6.972 [us]	1920 [dots]	6.465 [us]	720 [dots]	25.810 [us]
H.Blank Time	408 [dots]	3.022 [us]	560 [dots]	2.765 [us]	560 [dots]	2.440 [us]	720 [dots]	2.424 [us]	180 [dots]	6.450 [us]
H.Front Porch	16 [dots]	0.119 [us]	64 [dots]	0.316 [us]	64 [dots]	0.279 [us]	144 [dots]	0.485 [us]	18 [dots]	0.640 [us]
H.Sync Time	144 [dots]	1.067 [us]	192 [dots]	0.948 [us]	192 [dots]	0.837 [us]	224 [dots]	0.754 [us]	108 [dots]	3.870 [us]
H.Back Porch	248 [dots]	1.837 [us]	304 [dots]	1.501 [us]	304 [dots]	1.325 [us]	352 [dots]	1.185 [us]	54 [dots]	1.940 [us]
V.Tortal Time	1066 [lines]	13.329 [ms]	1250 [lines]	13.333 [ms]	1250 [lines]	11.765 [ms]	1500 [lines]	13.333 [ms]	564 [lines]	18.194 [ms]
V.Addr Time	1024 [lines]	12.804 [ms]	1200 [lines]	12.800 [ms]	1200 [lines]	11.294 [ms]	1440 [lines]	12.800 [ms]	428 [lines]	13.807 [ms]
V.Blank Time	42 [lines]	0.525 [ms]	50 [lines]	0.533 [ms]	50 [lines]	0.471 [ms]	60 [lines]	0.533 [ms]	136 [lines]	4.387 [ms]
V.Front Porch	1 [lines]	0.013 [ms]	1 [lines]	0.011 [ms]	1 [lines]	0.009 [ms]	1 [lines]	0.009 [ms]	52 [lines]	1.677 [ms]
V.Sync Time	3 [lines]	0.038 [ms]	3 [lines]	0.032 [ms]	3 [lines]	0.028 [ms]	3 [lines]	0.027 [ms]	2 [lines]	0.065 [ms]
V.Back Porch	38 [lines]	0.475 [ms]	46 [lines]	0.491 [ms]	46 [lines]	0.433 [ms]	56 [lines]	0.498 [ms]	82 [lines]	2.645 [ms]
Scan Type		Non-interlaced		Non-Interlaced		Non-interlaced		Non-Interlaced		Non-interlaced
H.Sync Polarity		Positive		Positive		Positive		Negative		Positive
V.Sync Polarity		Positive		Positive		Positive		Positive		Positive
		Separate		Separate		Separate		Separate		Composit

TIMING NAME	26 H.HOLD2 (110K)		27 H.HOLD2 (115K)		28 V.MAX		29 V.RASTER		30 EDID	
Pixel Clock		237.600 [MHz]		142.140 [MHz]		84.500 [MHz]		78.750 [MHz]		28.322 [MHz]
H.Frequency		110.000 [kHz]		115.000 [kHz]		65.000 [kHz]		60.023 [kHz]		31.463 [kHz]
V.Frequency		160.000 [Hz]		160.000 [Hz]		80.65 [Hz]		75.029 [Hz]		42.01 [Hz]
H.Tortal Time	2160 [dots]	9.091 [us]	1236 [dots]	8.695 [us]	1300 [dots]	15.38 [us]	1328 [dots]	16.66 [us]	900 [dots]	31.777 [us]
H.Addr Time	1600 [dots]	6.734 [us]	900 [dots]	6.332 [us]	1024 [dots]	12.12 [us]	1024 [dots]	13.003 [us]	720 [dots]	25.422 [us]
H.Blank Time	560 [dots]	2.357 [us]	336 [dots]	2.364 [us]	276 [dots]	3.26 [us]	288 [dots]	3.657 [us]	180 [dots]	6.36 [us]
H.Front Porch	64 [dots]	0.269 [us]	68 [dots]	0.478 [us]	24 [dots]	0.28 [us]	16 [dots]	0.203 [us]	18 [dots]	0.636 [us]
H.Sync Time	192 [dots]	0.808 [us]	100 [dots]	0.704 [us]	92 [dots]	1.09 [us]	96 [dots]	1.219 [us]	108 [dots]	3.813 [us]
H.Back Porch	309 [dots]	1.280 [us]	168 [dots]	1.182 [us]	160 [dots]	1.89 [us]	176 [dots]	2.235 [us]	54 [dots]	1.907 [us]
V.Tortal Time	687 [lines]	6.250 [ms]	718 [lines]	6.250 [ms]	806 [lines]	12.4 [ms]	800 [lines]	13.328 [ms]	749 [lines]	23.8 [ms]
V.Addr Time	660 [lines]	6.000 [ms]	690 [lines]	6.000 [ms]	596 [lines]	9.169 [ms]	788 [lines]	13.128 [ms]	685 [lines]	21.767 [ms]
V.Blank Time	27 [lines]	0.250 [ms]	28 [lines]	0.250 [ms]	210 [lines]	3.231 [ms]	13 [lines]	0.217 [ms]	64 [lines]	2.034 [ms]
V.Front Porch	1 [lines]	0.013 [ms]	1 [lines]	0.013 [ms]	89 [lines]	1.343 [ms]	0 [lines]	0 [ms]	14 [lines]	0.445 [ms]
V.Sync Time	4 [lines]	0.038 [ms]	4 [lines]	0.038 [ms]	6 [lines]	0.092 [ms]	3 [lines]	0.05 [ms]	3 [lines]	0.095 [ms]
V.Back Porch	22 [lines]	0.200 [ms]	23 [lines]	0.200 [ms]	115 [lines]	1.796 [ms]	9 [lines]	0.150 [ms]	47 [lines]	1.494 [ms]
Scan Type		Non-interlaced		Non-interlaced		Non-interlaced		Non-interlaced		Non-interlaced
H.Sync Polarity		Positive		Positive		Negative		Positive		Negative
V.Sync Polarity		Positive		Positive		Negative		Positive		Negative
		Separate		Separate		Separate		Separate		Separate

TIMING NAME	31 VESA 1600*1200@60Hz	32 VESA 1280*1024@85Hz	33 788*1200@75	34 812*1024@85	35 H.SIZE
Pixel Clock	162.000 [MHz]	157.500 [MHz]	99.900 [MHz]	99.900 [MHz]	229.500 [MHz]
H.Frequency	75.000 [kHz]	91.146 [kHz]	93.720 [kHz]	91.160 [kHz]	106.250 [kHz]
V.Frequency	60.000 [Hz]	85.024 [Hz]	74.980 [Hz]	85.040 [Hz]	85.000 [Hz]
H.Tortal Time	2160 [dots] 13.333 [us]	1728 [dots] 10.971 [us]	1066 [dots] 10.670 [us]	1096 [dots] 10.970 [us]	2160 [dots] 9.412 [us]
H.Addr Time	1600 [dots] 9.877 [us]	1280 [dots] 8.127 [us]	788 [dots] 7.890 [us]	812 [dots] 8.120 [us]	1520 [dots] 6.623 [us]
H.Blank Time	560 [dots] 3.457 [us]	448 [dots] 2.844 [us]	278 [dots] 2.780 [us]	284 [dots] 2.850 [us]	640 [dots] 2.789 [us]
H.Front Porch	64 [dots] 0.395 [us]	64 [dots] 0.406 [us]	34 [dots] 0.340 [us]	40 [dots] 0.410 [us]	104 [dots] 0.454 [us]
H.Sync Time	192 [dots] 1.185 [us]	160 [dots] 1.016 [us]	94 [dots] 0.940 [us]	102 [dots] 1.020 [us]	192 [dots] 0.837 [us]
H.Back Porch	304 [dots] 1.877 [us]	224 [dots] 1.422 [us]	150 [dots] 1.500 [us]	142 [dots] 1.420 [us]	344 [dots] 1.500 [us]
V.Tortal Time	1250 [lines] 16.667 [ms]	1072 [lines] 11.761 [ms]	1250 [lines] 13.337 [ms]	1072 [lines] 11.760 [ms]	1250 [lines] 11.765 [ms]
V.Addr Time	1200 [lines] 16.000 [ms]	1024 [lines] 11.235 [ms]	1200 [lines] 12.804 [ms]	1024 [lines] 11.233 [ms]	1200 [lines] 11.294 [ms]
V.Blank Time	50 [lines] 0.667 [ms]	48 [lines] 0.527 [ms]	50 [lines] 0.533 [ms]	48 [lines] 0.527 [ms]	50 [lines] 0.471 [ms]
V.Front Porch	1 [lines] 0.013 [ms]	1 [lines] 0.011 [ms]	1 [lines] 0.010 [ms]	1 [lines] 0.011 [ms]	1 [lines] 0.009 [ms]
V.Sync Time	3 [lines] 0.040 [ms]	3 [lines] 0.033 [ms]	3 [lines] 0.032 [ms]	3 [lines] 0.033 [ms]	3 [lines] 0.028 [ms]
V.Back Porch	46 [lines] 0.613 [ms]	44 [lines] 0.483 [ms]	46 [lines] 0.491 [ms]	44 [lines] 0.483 [ms]	46 [lines] 0.433 [ms]
Scan Type	Non-interlaced	Non-Interlaced	Non-interlaced	Non-interlaced	Non-interlaced
H.Sync Polarity	Positive	Positive	Positive	Positive	Positive
V.Sync Polarity	Positive	Positive	Positive	Positive	Positive
	Separate	Separate	Separate	Separate	Separate

TIMING NAME	36 H.HOLD2 (130K)	37 1920*1440@85	38	39	40
Pixel Clock	163.280 [MHz]	339.750 [MHz]	[MHz]	[MHz]	[MHz]
H.Frequency	130.000 [kHz]	128.693 [kHz]	[kHz]	[kHz]	[kHz]
V.Frequency	160.000 [Hz]	85.002 [Hz]	[Hz]	[Hz]	[Hz]
H.Tortal Time	1256 [dots] 7.692 [us]	2640 [dots] 7.77 [us]	[dots] [us]	[dots] [us]	[dots] [us]
H.Addr Time	900 [dots] 5.512 [us]	1920 [dots] 5.651 [us]	[dots] [us]	[dots] [us]	[dots] [us]
H.Blank Time	356 [dots] 2.180 [us]	720 [dots] 2.119 [us]	[dots] [us]	[dots] [us]	[dots] [us]
H.Front Porch	74 [dots] 0.453 [us]	149 [dots] 0.439 [us]	[dots] [us]	[dots] [us]	[dots] [us]
H.Sync Time	104 [dots] 0.637 [us]	211 [dots] 0.621 [us]	[dots] [us]	[dots] [us]	[dots] [us]
H.Back Porch	178 [dots] 1.090 [us]	360 [dots] 1.06 [us]	[dots] [us]	[dots] [us]	[dots] [us]
V.Tortal Time	813 [lines] 6.250 [ms]	1514 [lines] 11.764 [ms]	[lines] [ms]	[lines] [ms]	[lines] [ms]
V.Addr Time	740 [lines] 5.692 [ms]	1440 [lines] 11.189 [ms]	[lines] [ms]	[lines] [ms]	[lines] [ms]
V.Blank Time	73 [lines] 0.558 [ms]	74 [lines] 0.575 [ms]	[lines] [ms]	[lines] [ms]	[lines] [ms]
V.Front Porch	1 [lines] 0.008 [ms]	1 [lines] 0.008 [ms]	[lines] [ms]	[lines] [ms]	[lines] [ms]
V.Sync Time	3 [lines] 0.023 [ms]	3 [lines] 0.023 [ms]	[lines] [ms]	[lines] [ms]	[lines] [ms]
V.Back Porch	69 [lines] 0.527 [ms]	70 [lines] 0.544 [ms]	[lines] [ms]	[lines] [ms]	[lines] [ms]
Scan Type	Non-Interlaced	Non-Interlaced			
H.Sync Polarity	Positive	Positive			
V.Sync Polarity	Positive	Positive			
	Separate	Separate			

TIMING NAME	USER1 PC98 1120*750(I)		USER2 VESA 800*600@56Hz		USER3 VESA 1024*768@60Hz		USER4 VESA 800*600@72Hz		USER5 1120*750@60Hz	
Pixel Clock		47.846 [MHz]		36.000 [MHz]		65.000 [MHz]		50.000 [MHz]		78.431 [MHz]
H.Frequency		32.861 [kHz]		35.156 [kHz]		48.363 [kHz]		48.077 [kHz]		50.020 [kHz]
V.Frequency		78.993 [Hz]		56.250 [Hz]		60.004 [Hz]		72.188 [Hz]		60.048 [Hz]
H.Tortal Time	1456 [dots]	30.431 [us]	1024 [dots]	28.444 [us]	1344 [dots]	20.677 [us]	1040 [dots]	20.800 [us]	1568 [dots]	19.992 [us]
H.Addr Time	1120 [dots]	23.408 [us]	800 [dots]	22.222 [us]	1024 [dots]	15.754 [us]	800 [dots]	16.000 [us]	1120 [dots]	14.280 [us]
H.Blank Time	336 [dots]	7.023 [us]	224 [dots]	6.222 [us]	320 [dots]	4.923 [us]	240 [dots]	4.800 [us]	448 [dots]	5.712 [us]
H.Front Porch	112 [dots]	2.341 [us]	24 [dots]	0.667 [us]	24 [dots]	0.369 [us]	56 [dots]	1.120 [us]	168 [dots]	2.142 [us]
H.Sync Time	84 [dots]	1.756 [us]	72 [dots]	2.000 [us]	136 [dots]	2.092 [us]	120 [dots]	2.400 [us]	112 [dots]	1.428 [us]
H.Back Porch	140 [dots]	2.926 [us]	128 [dots]	3.556 [us]	160 [dots]	2.462 [us]	64 [dots]	1.280 [us]	168 [dots]	2.142 [us]
V.Tortal Time	416 [lines]	12.659 [ms]	625 [lines]	17.778 [ms]	806 [lines]	16.666 [ms]	666 [lines]	13.853 [ms]	833 [lines]	16.653 [ms]
V.Addr Time	375.5 [lines]	11.427 [ms]	600 [lines]	17.067 [ms]	768 [lines]	15.88 [ms]	600 [lines]	12.480 [ms]	750 [lines]	14.994 [ms]
V.Blank Time	40.5 [lines]	1.232 [ms]	25 [lines]	0.711 [ms]	38 [lines]	0.786 [ms]	66 [lines]	1.373 [ms]	83 [lines]	1.659 [ms]
V.Front Porch	9 [lines]	0.274 [ms]	1 [lines]	0.028 [ms]	3 [lines]	0.062 [ms]	37 [lines]	0.770 [ms]	27 [lines]	0.540 [ms]
V.Sync Time	5 [lines]	0.152 [ms]	2 [lines]	0.057 [ms]	6 [lines]	0.124 [ms]	6 [lines]	0.125 [ms]	10 [lines]	0.200 [ms]
V.Back Porch	26.5 [lines]	0.806 [ms]	22 [lines]	0.626 [ms]	29 [lines]	0.600 [ms]	23 [lines]	0.478 [ms]	46 [lines]	0.920 [ms]
Scan Type		Interlaced		Non-interlaced		Non-interlaced		Non-interlaced		Non-interlaced
H.Sync Polarity		Positive		Positive		Negative		Positive		Negative
V.Sync Polarity		Positive		Positive		Negative		Positive		Negative
		Separate		Separate		Separate		Separate		Separate

TIMING NAME	USER6 640*480@100Hz		USER7 XGA-2 1024*768@72Hz		USER8 800*600@100Hz		USER9 640*480@120Hz		USER10 640*480@140Hz	
Pixel Clock		42.000 [MHz]		79.000 [MHz]		68.179 [MHz]		50.400 [MHz]		58.800 [MHz]
H.Frequency		50.000 [kHz]		58.088 [kHz]		63.600 [kHz]		59.990 [kHz]		70.000 [kHz]
V.Frequency		100.000 [Hz]		71.980 [Hz]		100.000 [Hz]		119.980 [Hz]		140.000 [Hz]
H.Tortal Time	840 [dots]	20.000 [us]	1360 [dots]	17.215 [us]	1072 [dots]	15.723 [us]	840 [dots]	16.669 [us]	840 [dots]	14.286 [us]
H.Addr Time	640 [dots]	15.240 [us]	1024 [dots]	12.962 [us]	800 [dots]	11.734 [us]	640 [dots]	12.701 [us]	640 [dots]	10.884 [us]
H.Blank Time	200 [dots]	4.760 [us]	336 [dots]	4.253 [us]	272 [dots]	3.989 [us]	200 [dots]	3.969 [us]	200 [dots]	3.401 [us]
H.Front Porch	16 [dots]	0.380 [us]	8 [dots]	0.101 [us]	48 [dots]	0.704 [us]	16 [dots]	0.318 [us]	16 [dots]	0.272 [us]
H.Sync Time	64 [dots]	1.520 [us]	288 [dots]	3.646 [us]	88 [dots]	1.291 [us]	64 [dots]	1.270 [us]	64 [dots]	1.088 [us]
H.Back Porch	120 [dots]	2.860 [us]	40 [dots]	0.506 [us]	136 [dots]	1.995 [us]	120 [dots]	2.381 [us]	120 [dots]	2.041 [us]
V.Tortal Time	500 [lines]	10.000 [ms]	807 [lines]	13.893 [ms]	636 [lines]	10.000 [ms]	500 [lines]	8.335 [ms]	500 [lines]	7.143 [ms]
V.Addr Time	480 [lines]	9.600 [ms]	768 [lines]	13.221 [ms]	600 [lines]	9.434 [ms]	480 [lines]	8.001 [ms]	480 [lines]	6.857 [ms]
V.Blank Time	20 [lines]	0.400 [ms]	39 [lines]	0.671 [ms]	36 [lines]	0.566 [ms]	20 [lines]	0.334 [ms]	20 [lines]	0.286 [ms]
V.Front Porch	1 [lines]	0.020 [ms]	0 [lines]	0.000 [ms]	1 [lines]	0.016 [ms]	1 [lines]	0.017 [ms]	1 [lines]	0.014 [ms]
V.Sync Time	3 [lines]	0.060 [ms]	8 [lines]	0.138 [ms]	3 [lines]	0.047 [ms]	3 [lines]	0.050 [ms]	3 [lines]	0.043 [ms]
V.Back Porch	16 [lines]	0.320 [ms]	31 [lines]	0.534 [ms]	32 [lines]	0.503 [ms]	16 [lines]	0.267 [ms]	16 [lines]	0.229 [ms]
Scan Type		Non-interlaced		Non-interlaced		Non-interlaced		Non-interlaced		Non-interlaced
H.Sync Polarity		Negative		Negative		Positive		Negative		Negative
V.Sync Polarity		Negative		Negative		Positive		Negative		Negative
		Separate		Separate		Separate		Separate		Separate

TIMING NAME	USER11 VESA 1600*1200@60Hz		USER12 1280*1024@70Hz		USER13 VESA1152*864@85Hz		USER14 1024*768@100Hz		USER15 800*600@120Hz	
Pixel Clock		162.000 [MHz]		127.000 [MHz]		121.500 [MHz]		108.390 [MHz]		83.250 [MHz]
H.Frequency		75.000 [kHz]		74.970 [kHz]		77.094 [kHz]		80.647 [kHz]		78.835 [kHz]
V.Frequency		60.000 [Hz]		69.870 [Hz]		84.999 [Hz]		100.059 [Hz]		121.659 [Hz]
H.Tortal Time	2160 [dots]	13.333 [us]	1694 [dots]	13.339 [us]	1576 [dots]	12.971 [us]	1344 [dots]	12.400 [us]	1056 [dots]	12.685 [us]
H.Addr Time	1600 [dots]	9.877 [us]	1280 [dots]	10.079 [us]	1152 [dots]	9.481 [us]	1024 [dots]	9.447 [us]	800 [dots]	9.610 [us]
H.Blank Time	560 [dots]	3.457 [us]	414 [dots]	3.260 [us]	424 [dots]	3.490 [us]	320 [dots]	2.952 [us]	256 [dots]	3.075 [us]
H.Front Porch	64 [dots]	0.395 [us]	30 [dots]	0.236 [us]	64 [dots]	0.527 [us]	24 [dots]	0.221 [us]	32 [dots]	0.384 [us]
H.Sync Time	192 [dots]	1.185 [us]	160 [dots]	1.260 [us]	128 [dots]	1.053 [us]	136 [dots]	1.255 [us]	80 [dots]	0.961 [us]
H.Back Porch	304 [dots]	1.877 [us]	224 [dots]	1.764 [us]	232 [dots]	1.909 [us]	160 [dots]	1.476 [us]	144 [dots]	1.730 [us]
V.Tortal Time	1250 [lines]	16.667 [ms]	1073 [lines]	14.312 [ms]	907 [lines]	11.765 [ms]	806 [lines]	9.994 [ms]	648 [lines]	8.220 [ms]
V.Addr Time	1200 [lines]	16.000 [ms]	1024 [lines]	13.659 [ms]	864 [lines]	11.207 [ms]	768 [lines]	9.523 [ms]	600 [lines]	7.611 [ms]
V.Blank Time	50 [lines]	0.667 [ms]	49 [lines]	0.654 [ms]	43 [lines]	0.558 [ms]	38 [lines]	0.471 [ms]	48 [lines]	0.609 [ms]
V.Front Porch	1 [lines]	0.013 [ms]	3 [lines]	0.040 [ms]	1 [lines]	0.013 [ms]	3 [lines]	0.037 [ms]	2 [lines]	0.025 [ms]
V.Sync Time	3 [lines]	0.040 [ms]	4 [lines]	0.053 [ms]	3 [lines]	0.039 [ms]	6 [lines]	0.074 [ms]	4 [lines]	0.051 [ms]
V.Back Porch	46 [lines]	0.613 [ms]	42 [lines]	0.560 [ms]	39 [lines]	0.506 [ms]	29 [lines]	0.360 [ms]	42 [lines]	0.533 [ms]
Scan Type		Non-Interlaced		Non-interlaced		Non-Interlaced		Non-Interlaced		Non-interlaced
H.Sync Polarity		Positive		Negative		Positive		Positive		Positive
V.Sync Polarity		Positive		Negative		Positive		Positive		Positive
		Separate		Sync on G		Separate		Separate		Separate
TIMING NAME	USER16 640*480@160Hz		USER17 VESA 1920*1440@60Hz		USER18 VESA 1600*1200@70Hz		USER19 800*600@140Hz		USER20 VESA 1792*1344@75Hz	
Pixel Clock		67.200 [MHz]		234.000 [MHz]		189.000 [MHz]		92.300 [MHz]		261.000 [MHz]
H.Frequency		80.000 [kHz]		90.000 [kHz]		87.500 [kHz]		87.488 [kHz]		106.270 [kHz]
V.Frequency		160.000 [Hz]		60.000 [Hz]		70.000 [Hz]		139.981 [Hz]		74.997 [Hz]
H.Tortal Time	840 [dots]	12.500 [us]	2600 [dots]	11.111 [us]	2160 [dots]	11.429 [us]	1055 [dots]	11.430 [us]	2456 [dots]	9.410 [us]
H.Addr Time	640 [dots]	9.524 [us]	1920 [dots]	8.205 [us]	1600 [dots]	8.466 [us]	799 [dots]	8.657 [us]	1792 [dots]	6.866 [us]
H.Blank Time	200 [dots]	2.976 [us]	680 [dots]	2.906 [us]	560 [dots]	2.963 [us]	256 [dots]	2.774 [us]	664 [dots]	2.544 [us]
H.Front Porch	16 [dots]	0.238 [us]	128 [dots]	0.547 [us]	64 [dots]	0.339 [us]	16 [dots]	0.173 [us]	96 [dots]	0.368 [us]
H.Sync Time	64 [dots]	0.952 [us]	208 [dots]	0.889 [us]	192 [dots]	1.016 [us]	80 [dots]	0.867 [us]	216 [dots]	0.828 [us]
H.Back Porch	120 [dots]	1.786 [us]	344 [dots]	1.470 [us]	304 [dots]	1.608 [us]	160 [dots]	1.733 [us]	352 [dots]	1.349 [us]
V.Tortal Time	500 [lines]	6.250 [ms]	1500 [lines]	16.667 [ms]	1250 [lines]	14.286 [ms]	625 [lines]	7.144 [ms]	1417 [lines]	13.334 [ms]
V.Addr Time	480 [lines]	6.000 [ms]	1440 [lines]	16.000 [ms]	1200 [lines]	13.714 [ms]	600 [lines]	6.858 [ms]	1344 [lines]	12.647 [ms]
V.Blank Time	20 [lines]	0.250 [ms]	60 [lines]	0.667 [ms]	50 [lines]	0.571 [ms]	25 [lines]	0.286 [ms]	73 [lines]	0.687 [ms]
V.Front Porch	1 [lines]	0.013 [ms]	1 [lines]	0.011 [ms]	1 [lines]	0.011 [ms]	1 [lines]	0.011 [ms]	1 [lines]	0.009 [ms]
V.Sync Time	3 [lines]	0.038 [ms]	3 [lines]	0.033 [ms]	3 [lines]	0.034 [ms]	3 [lines]	0.034 [ms]	3 [lines]	0.028 [ms]
V.Back Porch	16 [lines]	0.200 [ms]	56 [lines]	0.622 [ms]	46 [lines]	0.526 [ms]	21 [lines]	0.240 [ms]	69 [lines]	0.649 [ms]
Scan Type		Non-Interlaced		Non-interlaced		Non-Interlaced		Non-interlaced		Non-Interlaced
H.Sync Polarity		Negative		Negative		Positive		Positive		Negative
V.Sync Polarity		Negative		Positive		Positive		Positive		Positive
		Separate		Separate		Separate		Separate		Separate

TIMING NAME	USER21 VESA 1600*1200@80Hz		USER22 1024*768@120Hz		USER23 800*600@160Hz		USER24 VESA1920*1440@75		USER25 1792*1344@85Hz	
Pixel Clock		216.000 [MHz]		139.054 [MHz]		116.406 [MHz]		297.000 [MHz]		297.000 [MHz]
H.Frequency		100.000 [kHz]		98.760 [kHz]		105.440 [kHz]		112.500 [kHz]		120.536 [kHz]
V.Frequency		80.000 [Hz]		120.000 [Hz]		160.000 [Hz]		75.000 [Hz]		85.004 [Hz]
H.Tortal Time	2160 [dots]	10.000 [us]	1408 [dots]	10.126 [us]	1104 [dots]	9.484 [us]	2640 [dots]	8.889 [us]	2464 [dots]	8.296 [us]
H.Addr Time	1600 [dots]	7.407 [us]	1024 [dots]	7.364 [us]	800 [dots]	6.873 [us]	1920 [dots]	6.465 [us]	1792 [dots]	6.034 [us]
H.Blank Time	560 [dots]	2.593 [us]	384 [dots]	2.762 [us]	304 [dots]	2.612 [us]	720 [dots]	2.424 [us]	672 [dots]	2.262 [us]
H.Front Porch	64 [dots]	0.296 [us]	80 [dots]	0.575 [us]	64 [dots]	0.550 [us]	144 [dots]	0.485 [us]	136 [dots]	0.458 [us]
H.Sync Time	192 [dots]	0.889 [us]	112 [dots]	0.805 [us]	88 [dots]	0.765 [us]	224 [dots]	0.754 [us]	200 [dots]	0.673 [us]
H.Back Porch	304 [dots]	1.407 [us]	192 [dots]	1.381 [us]	152 [dots]	1.306 [us]	352 [dots]	1.185 [us]	336 [dots]	1.131 [us]
V.Tortal Time	1250 [lines]	12.500 [ms]	823 [lines]	8.333 [ms]	659 [lines]	6.250 [ms]	1500 [lines]	13.333 [ms]	1418 [lines]	11.764 [ms]
V.Addr Time	1200 [lines]	12.000 [ms]	768 [lines]	7.776 [ms]	600 [lines]	5.690 [ms]	1440 [lines]	12.800 [ms]	1344 [lines]	11.150 [ms]
V.Blank Time	50 [lines]	0.500 [ms]	55 [lines]	0.557 [ms]	59 [lines]	0.560 [ms]	60 [lines]	0.533 [ms]	74 [lines]	0.614 [ms]
V.Front Porch	1 [lines]	0.010 [ms]	1 [lines]	0.010 [ms]	1 [lines]	0.009 [ms]	1 [lines]	0.009 [ms]	1 [lines]	0.008 [ms]
V.Sync Time	3 [lines]	0.030 [ms]	3 [lines]	0.030 [ms]	3 [lines]	0.028 [ms]	3 [lines]	0.027 [ms]	3 [lines]	0.025 [ms]
V.Back Porch	46 [lines]	0.460 [ms]	51 [lines]	0.516 [ms]	55 [lines]	0.522 [ms]	56 [lines]	0.498 [ms]	70 [lines]	0.581 [ms]
Scan Type		Non-Interlaced		Non-Interlaced		Non-Interlaced		Non-Interlaced		Non-Interlaced
H.Sync Polarity		Positive		Positive		Positive		Positive		Positive
V.Sync Polarity		Positive		Positive		Positive		Positive		Positive
		Separate		Separate		Separate		Separate		Separate

TIMING NAME	USER26 2048*1536@80		USER27 1920*1440@85							
Pixel Clock		364.308 [MHz]		339.750 [MHz]		[MHz]		[MHz]		[MHz]
H.Frequency		128.640 [kHz]		128.693 [kHz]		[kHz]		[kHz]		[kHz]
V.Frequency		80.000 [Hz]		85.002 [Hz]		[Hz]		[Hz]		[Hz]
H.Tortal Time	2832 [dots]	7.774 [us]	2640 [dots]	7.770 [us]	[dots]	[us]	[dots]	[us]	[dots]	[us]
H.Addr Time	2048 [dots]	5.622 [us]	1920 [dots]	5.651 [us]	[dots]	[us]	[dots]	[us]	[dots]	[us]
H.Blank Time	784 [dots]	2.152 [us]	720 [dots]	2.119 [us]	[dots]	[us]	[dots]	[us]	[dots]	[us]
H.Front Porch	168 [dots]	0.461 [us]	149 [dots]	0.439 [us]	[dots]	[us]	[dots]	[us]	[dots]	[us]
H.Sync Time	224 [dots]	0.615 [us]	211 [dots]	0.621 [us]	[dots]	[us]	[dots]	[us]	[dots]	[us]
H.Back Porch	392 [dots]	1.076 [us]	360 [dots]	1.060 [us]	[dots]	[us]	[dots]	[us]	[dots]	[us]
V.Tortal Time	1608 [lines]	12.500 [ms]	1514 [lines]	11.764 [ms]	[lines]	[ms]	[lines]	[ms]	[lines]	[ms]
V.Addr Time	1536 [lines]	11.940 [ms]	1440 [lines]	11.189 [ms]	[lines]	[ms]	[lines]	[ms]	[lines]	[ms]
V.Blank Time	72 [lines]	0.560 [ms]	74 [lines]	0.575 [ms]	[lines]	[ms]	[lines]	[ms]	[lines]	[ms]
V.Front Porch	1 [lines]	0.008 [ms]	1 [lines]	0.008 [ms]	[lines]	[ms]	[lines]	[ms]	[lines]	[ms]
V.Sync Time	3 [lines]	0.023 [ms]	3 [lines]	0.023 [ms]	[lines]	[ms]	[lines]	[ms]	[lines]	[ms]
V.Back Porch	68 [lines]	0.529 [ms]	70 [lines]	0.544 [ms]	[lines]	[ms]	[lines]	[ms]	[lines]	[ms]
Scan Type		Non-Interlaced		Non-Interlaced						
H.Sync Polarity		Positive		Positive						
V.Sync Polarity		Positive		Positive						
		Separate		Separate						

NOTE) Use special signals when original signals can not be made by equipped signal generator. Don't use these signal timing for Focus Adjustment. (The resolution is different.)

	Program No.	Original	Special	Original	Special	Original	Special	Original	Special	Original	Special	Original	Special
		16	16	18	18	21	21	22	22	23	23	24	24
	Signal Name	VESA1280* 1024@60	-	MAC1152* 870	-	VESA1280* 1024@75	-	VESA1600* 1200@75	-	VESA1600* 1200@85	-	VESA1920* 1440@75	-
	Resolution	1280*1024	-	1152*870	-	1280*1024	-	1600*1200	-	1600*120	-	1920*1440	-
	Dot Clock	108.000	81	100.000	75	135.000	67.5	202.500	50.625	229.500	57.375	297.000	74.250
	fh	63.981	63.981	68.681	68.681	79.976	79.976	93.750	93.750	106.250	106.250	112.500	112.500
	fv	60.020	60.020	75.062	75.062	75.025	75.025	75.000	75.000	85.000	85.000	75.000	75.000
Horizontal	Cell Size	8	8	8	8	8	8	8	8	8	8	8	8
	Total	1688	1266	1456	1092	1688	844	2160	540	2160	540	2640	660
	(CHR)	211	158	182	137	211	106	270	68	270	68	330	83
	(uS)	15.630	15.63	14.560	14.560	12.504	12.504	10.667	10..667	9.412	9.412	8.889	8.889
	Disp	1280	960	1152	864	1280	640	1600	400	1600	400	1920	480
	(CHR)	160	120	144	108	160	80	200	50	200	50	240	60
	(uS)	11.852	11.852	11.520	11.520	9.481	9.481	7.901	7.901	6.972	6.972	6.465	6.465
	Front	48	36	32	24	16	8	64	16	64	16	144	36
	(uS)	0.444	0.444	0.320	0.320	0.119	0.119	0.316	0.316	0.279	0.279	0.485	0485
	Sync	112	84	128	96	144	72	192	48	192	48	224	56
	(uS)	1.037	1.037	1.280	1.280	1.067	1.067	0.948	0.948	0.837	0.837	0.754	0.754
	Back	248	186	144	108	248	124	304	76	304	76	352	88
	(uS)	2.296	2.296	1.440	1.440	1.837	1.837	1.501	1.501	1.325	1.325	1.185	1.185
	Program No.	Original	Special	Original	Special	Original	Special	Original	Special	Original	Special	Original	Special
		26	26	27	27	32	32	33	33	34	34	35	35
	Signal Name	H.HOLD2 (110K)	-	H.HOLD2 (115K)	-	VESA1280* 1024@85	-	788*1200 @75	-	812*1024 @85	-	H.SIZE	-
	Resolution					1280*1024	-	788*1200		812*1024			
	Dot Clock	237.600	59.400	142.140	71.070	157.500	78.750	99.900	74.925	99.900	74.925	229.500	57.375
	fh	110.000	110.000	115.000	115.000	91.146	91.146	93.720	93.720	91.160	91.160	106.250	106.250
	fv	160.000	160.000	160.000	160.000	85.024	85.024	74.980	74.980	85.040	85.040	85.000	85.000
Horizontal	Cell Size	8	8	8	8	8	8	8	8	8	8	8	8
	Total	2160	540	1236	618	1728	864	1066	800	1096	822	2160	540
	(CHR)	270	68	155	77	216	108	133	100	137	103	270	68
	(uS)	9.091	9.091	8.695	8.695	10.971	10.971	10.670	10.670	10.970	10.970	9.412	9.412
	Disp	1600	400	900	450	1280	640	788	591	812	609	1520	380
	(CHR)	200	50	113	56	160	80	99	74	102	76	190	48
	(uS)	6.734	6.734	6.332	6.332	8.127	8.127	7.890	7.890	8.120	8.120	6.623	6.623
	Front	64	16	68	34	64	32	34	26	40	30	104	26
	(uS)	0.269	0.269	0.478	0.478	0.406	0.406	0.340	0.340	0.410	0.410	0.454	0.454
	Sync	192	48	100	50	160	80	94	71	102	77	192	48
	(uS)	0.808	0.808	0.704	0.704	1.016	1.016	0.940	0.940	1.020	1.020	0.837	0.837
	Back	309	77	168	84	224	112	150	113	142	107	344	86
	(uS)	1.280	1.280	1.182	1.182	1.422	1.422	1.500	1.500	1.420	1.420	1.500	1.500

3. Connector, test pins

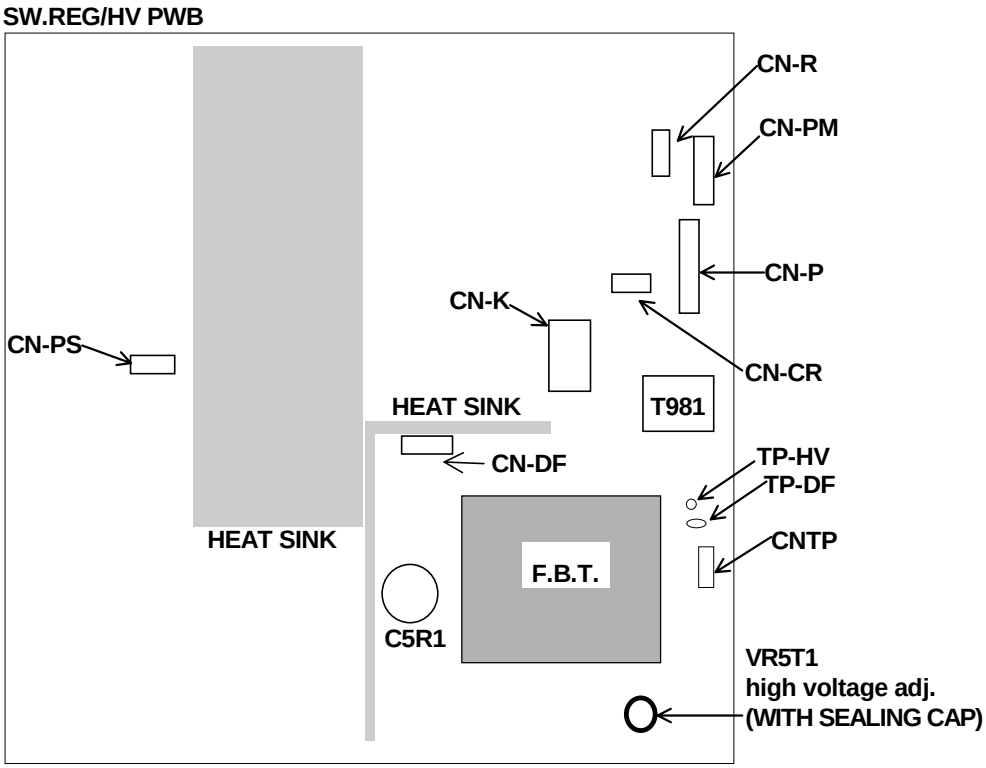


Fig.3-1 SW/HV PWB

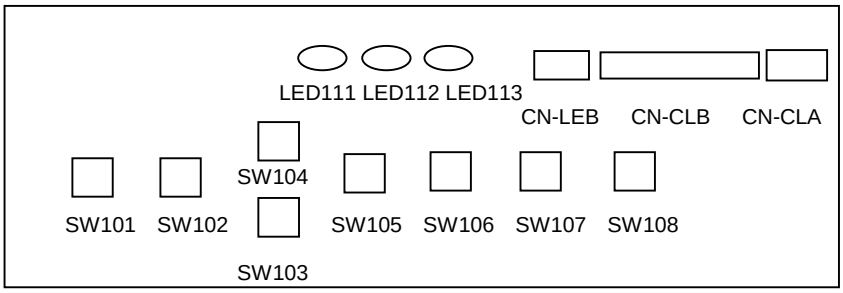


Fig.3-2 CONT PWB

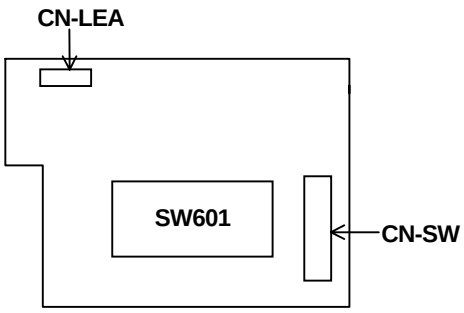


Fig.3-3 SW PWB

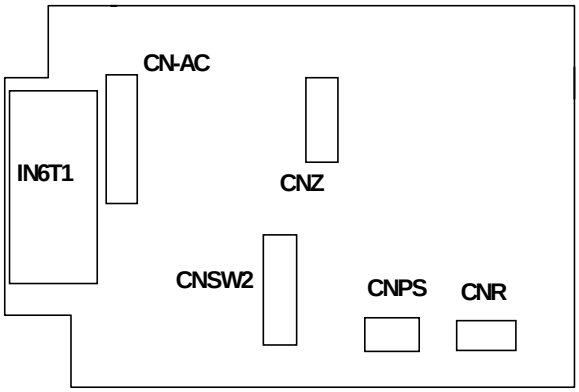


Fig.3-4 INLET PWB

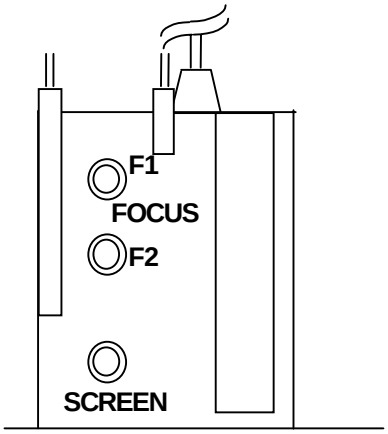


Fig.3-5 F.B.T VR

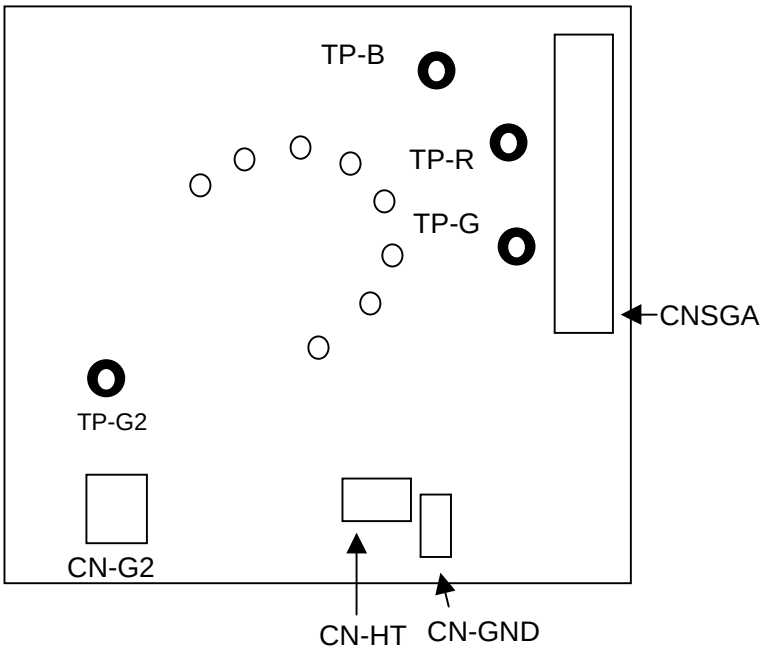


Fig.3-6 CRT PWB

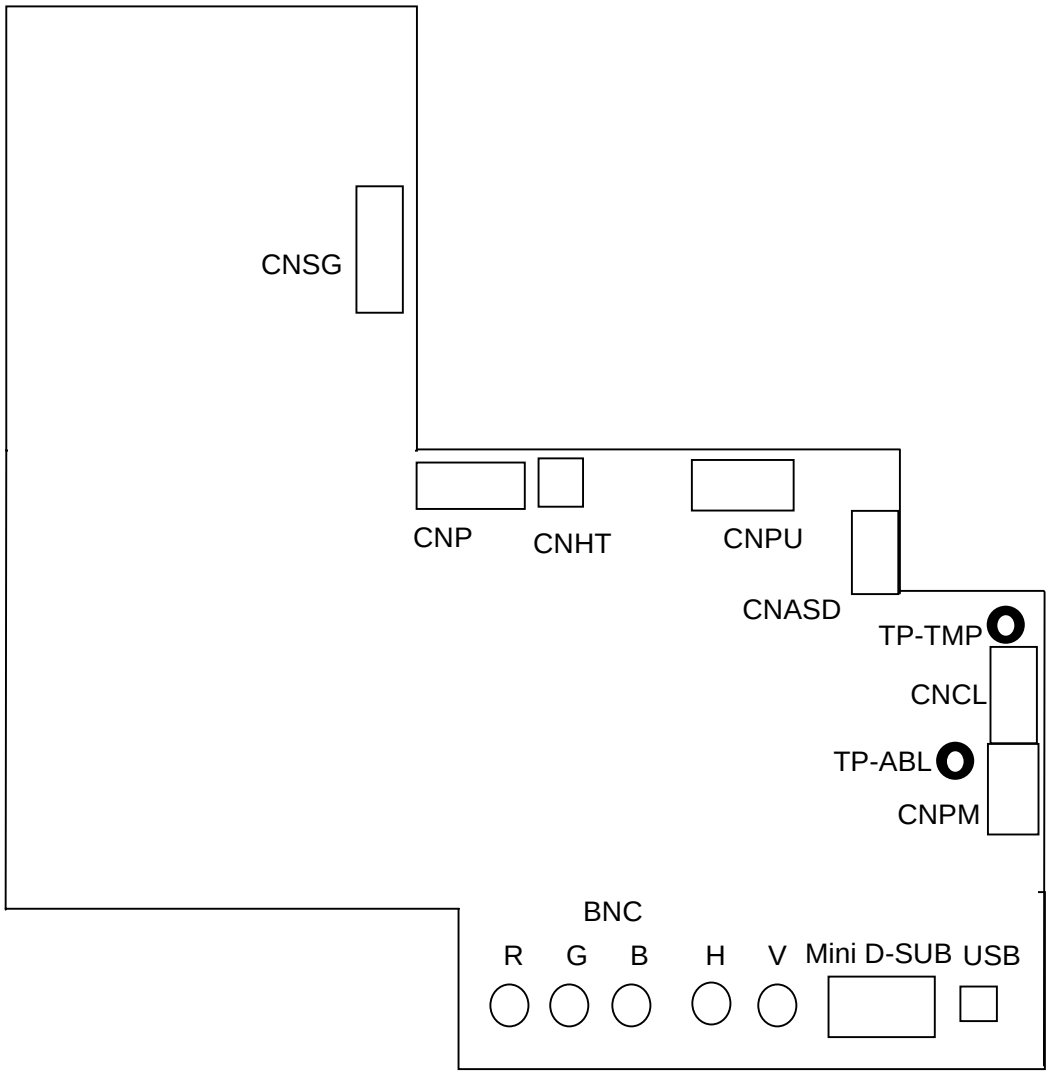


Fig.3-7 VIDEO PWB

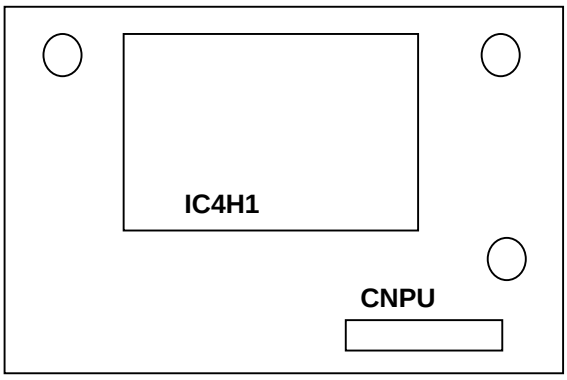


Fig.3-8 PU PWB

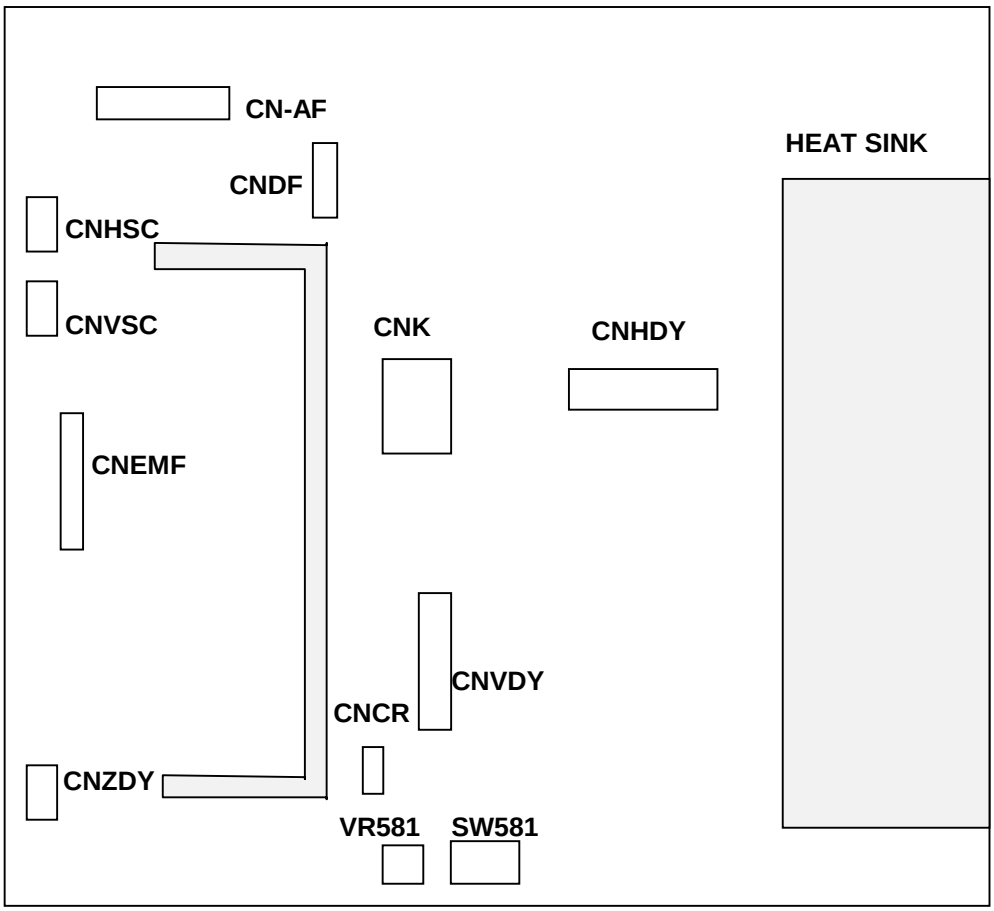


Fig.3-9 DEF PWB

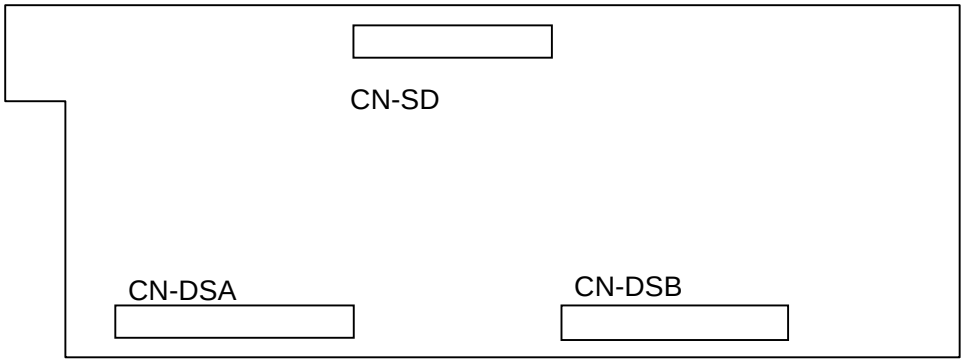


Fig.3-10 OSC PWB

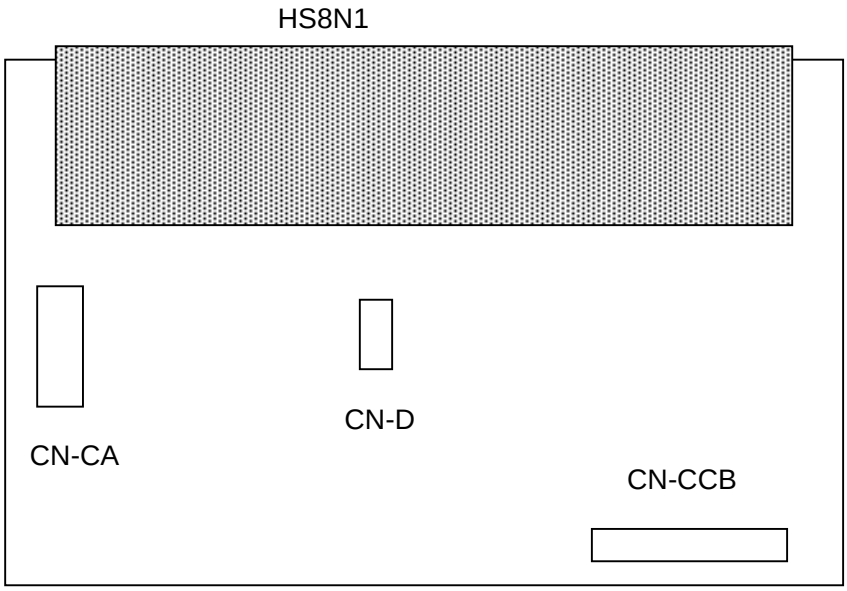


Fig.3-11 CONV PWB

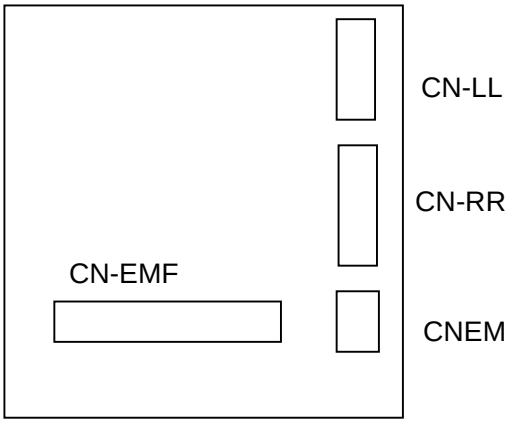


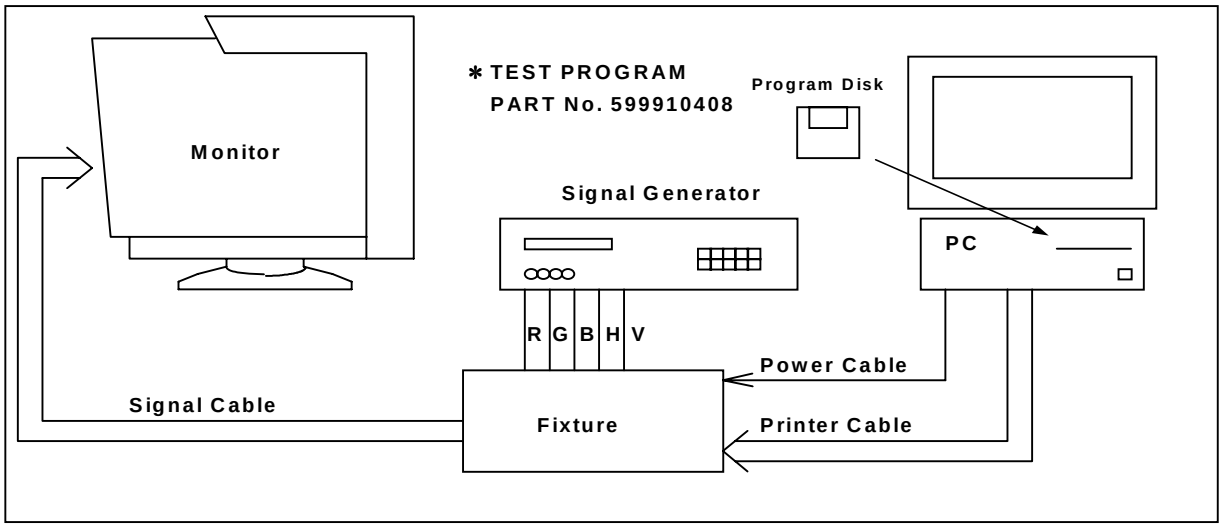
Fig.3-12 EMF PWB

INSPECTION

1. Inspection of PLUG & PLAY communication

1-1. A construction of System

This system should be connected as shown below.



1-2. Starting method

1) Input Signal

Input signal must be separate sync. Two kinds of signals must be prepared.
One is the signal whose vertical synchronization frequency is 42Hz, and another is the signal whose vertical synchronization frequency is between 55Hz and 25kHz.
Horizontal synchronization frequency should be set to reasonable value (example 31.5kHz).

2) Power ON procedure

- First, put the floppy disk for PnP Inspection into PC and turn on PC.
- Turn on Fixture.
- Make sure that fixture's LED turns on and off.
- Turn on signal generator and monitor.

3) Starting PC Software

- Inspection of PnP communication

  To check the PnP communication, EDID file name is FP1370, set "P FP1370" to DOS command line and press return key.

- Writing EDID to EEPROM and inspection of PnP communication

  To write EDID to EEPROM and check the PnP communication which its EDID file name is FP1370, type "WP FP1370" on DOS prompt line and press return key.

1-3. Operation

- The operation should be performed according to the screen message.
- When the message of “Please set Vsync to 42Hz.” is displayed, set the signal generator to the signal with vertical synchronization frequency of 42Hz. When the message of “Please set Vsync to over 55Hz.” is displayed, set the signal generator to the signal whose vertical synchronization frequency is between 55Hz and 25kHz.
- The message of “Normally Complete” means that writing of EDID data or PnP inspection completed normally. The message of “Error” means that writing of EDID data or PnP inspection finished incorrectly.
- When the PnP inspection is completed, read EDID data would be displayed. And if the read EDID data differed from the original EDID data, the different bytes would be displayed in red.
- For the details of error, see the messages displayed at the bottom right of the screen. The meaning of the messages is shown on section 4.
- After writing of EDID data or inspection of DDC2B, monitor can not be communicated by DDC1. In that case, turn off and on the monitor again, which will make the DDC1 communication test possible.
- Make sure that fixture’s LED flashes on and off before writing EDID data, inspecting DDC1 and DDC2B. If the fixture’s LED does not flash on and off, turn off and turn on the monitor and the fixture.

1-4. Error Messages

- Start Bit Error
  This message is displayed when the start bit is not “H” while sending data from PC to MPU on the fixture. This error will be caused by noise etc. on the line.
- Command Error
  This message is displayed when the different command is sent from PC to MPU on the fixture.
- Hardware Error
  This message means that the PC does not recognize ACK command sent from the MPU on the fixture.
- File Open Error
  This message means that the input EDID file name was wrong.
- Command line Switch Error
  This message means that the input communication command is incorrect.
- Parity Error
  This message is displayed when the MPU on the fixture recognized the parity bit is incorrect. This error can be caused by noise etc. on the line.
- EDID Data Error
  This message is displayed when the null bit is not detected in EDID data read by DDC1 communication.
- EDID Data Sort Error
  This message is displayed when the header code is not detected in EDID data read by DDC1 communication.
- Time Out Error
  This message is displayed when the PC does not recognize ACK commands sent from MPU within 10m sec after the PC had sent communication command or EDID data. If this error occurs, check the connection on PC, fixture and monitor.

1-5. EDID data file

The EDID data file text is shown below. When you write or inspect EDID for this monitor, the following table can be used.

File name : FP1370

EDID-151

	0	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**A**	**B**	**C**	**D**	**E**	**F**
00	00	FF	FF	FF	FF	FF	FF	00	38	A3	A8	61	01	01	01	01
10	2D	09	01	02	0E	29	1E	78	EA	A0	B8	A2	54	4C	9B	26
20	10	48	4C	FF	FF	80	31	59	45	59	61	59	71	4F	81	99
30	A9	59	D1	4F	E1	54	A6	59	40	30	62	B0	32	40	40	C0
40	13	00	8C	29	11	00	00	1E	00	00	00	FD	00	37	A0	1F
50	82	24	00	0A	20	20	20	20	20	20	00	00	00	FC	00	4E
60	45	43	20	46	50	31	33	37	30	0A	20	20	00	00	00	FF
70	00	38	36	30	30	30	30	31	52	41	0A	20	20	20	00	59

Table 1-5. Data list (Management number : EDID-151)

※1 : address 10h　　Manufactured month x 4
※2 : address 11h　　Manufactured year - 1990
※3 : address 71h ～ 7Dh　　Input serial number (ASCII code). Add 20th remaining address.
※4 : address 7Fh　　Checksum. The sum of entire 128byte shall be equal to 00h.

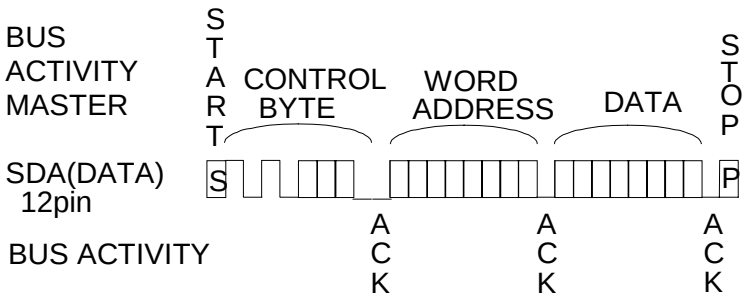


Diagram 1-5 Timing chart of DDC2B

2. Serial No./Model name writing procedures

2-1. Outline description

This is a program intended to write the contents of the “MODEL NUMBER” and the “SERIAL NUMBER” indicated in the OSM menu [Menu (U), Tag 7], “MONITOR INFO”.

2-2. Jigs and tools required

AUTO ADJ I/F JIG (PART No. : 599910401(120V) / 599910402(240V))

Serial No./Model name writing program (PART No. 599910512)

In this case, however, the program of serial No./ model name writing program is used in place of the automatic adjustment program.

2-3. Connection method

The connection method is the same as the one specified in the connection diagram for the automatic adjustment of size, position, and distortion.

In this case, however, the program of serial No./ model name writing program is used in place of the automatic adjustment program.

2-4. Writing order

(1) Turn on all equipment units other than the PC.

(2) Enter a signal input in the monitor.

(3) Confirm that there is a display of “Please change the monitor into factory mode state.” in the monitor screen. When this display is seen, set the monitor at the factory mode.

(4) Turn on the power supply for the personal computer and start this computer with the floppy disk for serial No./ model name writing.

(5) When you see a display of “Please input id product code,” enter 2 characters of EDID data address 0A(H) and 2 more characters of address 0B(H), an input of 4 characters in all.

At that time, you should enter the 2 characters of address 0B(H) at first, then the EDID data address 0A(H).

Example) When the EDID data are as follows:

Address 0A(H) : A8(H) data

Address 0B(H) : 61(H) data

For the command line of the writing software, enter “61A8” and press the ENTER key.

(6) Since the confirmation message is displayed, press the “Y” key if this message is found correct.

Note) At that time, characters of “UMA” and the like may be displayed as “XXX.” Even in such a If “-0” is displayed at the end, nothing is displayed on actual OSM screen.

(7) Processing for model name writing is executed.

If any message other than “Factory Communication OK” is displayed, the above steps should be repeated from the beginning again.

(8) When you see a display of “Please input serial no.” enter the nine digits of the serial number and press the ENTER key.

(9) Since the confirmation message is displayed, press the “Y” key if this message is found correct.

(10) Processing for serial number writing is executed.

(11) If any message other than “Factory Communication OK” is displayed, the above steps should be repeated from the beginning again.

(12) At this step, the writing work has been finished. Confirm that the “MODEL NUMBER” and the “SERIAL NUMBER” are correctly displayed on the OSM screen.

3. CRT

[A] CRT face plate defect

1. Inspection condition

1) In the operating condition, observe the defect on the screen under following condition :
9,300K ($\triangle$x=0.281, $\triangle$y=0.311)
white raster or the element monochrome raster which its brightness is 34cd/m^2 (10ft·L) on the screen center surrounding light is about 10 Lux

2) In the non-operating condition, observe the defect of the screen under light of about 200 Lux, measured at the faceplate.

3) Inspection shall be made more than 45 cm away from the screen.

4) Observe the screen on white raster and each monochrome color of red, green, and blue.

2. Division of zone

A screen is divided into following 2 zones.

Zone A: Area inside the rectangle that its size measures H: 395 mm, V: 295 mm in the center of screen.

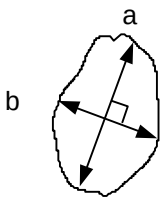
Zone B: Area outside the above rectangle

3. Limits

3-1. CRT face defect

3-1-1. Distance (minimum distance)

3-1-2. Average diagram



Turn of $\frac{a+b}{2}$ or $\frac{a}{20}+2b$ small value into an on the average diameter. (a: length, b: width)

3-1-3. Limit

- Dark spot, Blocked aparture

Average diameter(mm)	A	B	A + B	minimum distance
0.51 ~	0	0	0	-
0.31 ~ 0.50	0	0	0	-
0.15 ~ 0.30	6 (note 1)	6 (note 1)	10 (note 1)	10 mm

- Discoloration, stain, Missing phospher, etc.

Average diameter(mm)	A	B	A + B	minimum distance
0.51 ~ 0.75	0	1	-	20 mm
0.15 ~ 0.50	2	3	-	20 mm

Note 1: No missing spot larger than specified are allowed in Zone A.

Note 2: The spec. applies to each color.

3-2. Face plate defect

3-2-1. Blisters, opaque spots and elongated closed blisters

Average diameter (mm) #1	Allowable number(pcs)			Minimum Separation (mm)
	Zone A	Zone B	Total	
0.76 ～	0	0	0	30
0.51 ～ 0.75	0	1	1	
0.26 ～ 0.50	2	3	5	
0.11 ～ 0.25	-	-	-	

#1: More than 5 detects shall not gather in a Φ10 circle.

3-2-2. Scratch

Width(mm)	Allowable Length(mm)
0.16 ～	Rejected
0.11 ～ 0.15	3
0.06 ～ 0.10	26
～ 0.05	Unlimited

3-2-3. Other glass defects

Flaw, crack and lack cannot be distinguish easily by naked eye.

Iron rust conforms to limited sample.

[B] AR-film's surface defect

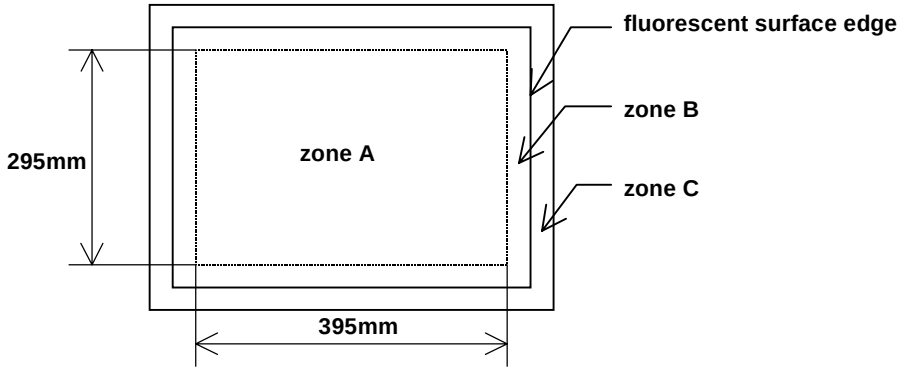
1. Inspection condition
   1) Put a valve on an inspective stand and Illuminate it from the top with white fluorescent light.
   2) Valve surface illuminance is less than 1500Lux and more than 1000Lux.
   3) Observe from distance of 40cm from surface, disregard flaws which can not be distinguished from this distance.
2. Division of zone

A screen is divided into following 3 zones.

Zone A: Area inside the rectangle that measures H: 395 mm, V: 295 mm at the center of screen.

Zone B: Area outside zone A and inside the fluorescent surface edge.

Zone C: Area outside the fluorescent surface edge.



3. Limits

3-1. Scratch

Width(mm)	Allowable Length(mm)(Zone A + Zone B)
0.16 ～	reject
0.11 ～ 0.15	13
0.06 ～ 0.10	26
～ 0.05	unlimited

NOTE 1: Even though width of scratch is more than 0.16mm, regard scratch whose contrast is weak extremely as stain and apply standard of 3.2.

NOTE 2: Do not recognize flaws which injures goods prices though it is not especially stipulated as for zone C.

3-2. Opaque flaws (ex. Stain) and coating peeling

Do not apply the following standard to zone C.

Classify flaws by contrast and judge it by size.

Definition of a contrast

High contrast :The foreign substance which shuts off light from fluorescence surface

Middle contrast :A semitransparent foreign substance and stain (Ex. coating material which has been changed)

Low contrast :stain and dust which do not reflect light from fluorescence surface and can be distinguished by its appearance

Standard

Average diameter classified by a contrast NOTE 4 (mm)			Allowable number		Allowable Length (mm) NOTE 3
High contrast	Middle contrast	Low contrast	zone A	zone B	
～ 0.10	～ 0.20	～ 0.50	Rejected	Rejected	-
0.11 ～ 0.25	0.21 ～ 0.50	0.51 ～ 1.25	2［4］	4［5］	20
0.26 ～ 0.50	0.51 ～ 1.00	1.26 ～ 2.50	1［4］	2［4］	40
0.51 ～ 0.75	1.01 ～ 1.50	2.51 ～ 3.75	0［4］	1［4］	80

NOTE 1: A number inside brackets show allowable number of Low contrast. However, it is based on the following tables as for the total number of a low contrastive fault.

NOTE 2: If a defect has different contrast's one in it, shall be judged by higher contrast's specification.

NOTE 3: Allowable length between the different class is applied on size standard.

NOTE 4: Convert (a+b)/2 or a/20 + 2b small value into average diameter. (a: length, b: width)

total number of a low contrast flaws	zone A	zone B
Standard classified by zones	6	8
Total (zone A + zone B)	10	

3-3. Reflectance

Less than 0.7% (at the screen center)

3-4. Reflected color unevenness

The reflected color unevenness which can be confirmed easily in visual check must not exist.

3-5. Strength

Wear and abrasion resistance: Coating should withstand 30 - minute scrubbing with a #50 eraser. (load; 500g)

Pencil resistance : Coating should withstand 3H pencil. (according to conformed item of Coating Strength JIS - 5400)

[Supplementary explanation]

Definition of striped coating (tear) and flaw (rubbed coating). (according to JIS)

Striped coating (tear) : Tear that reaches to the glass surface.

Flaw (rubbed coating) : Scratches that slightly dig into the surface of the coating

3-6. Stain, blur, unevenness, and other faults

The flaws must not be to be distinguishable in white raster or green raster.

4. Notice for cleaning up the surface of faceplate filmed over by the AR - film.

4-1. Do not rub CRT surface with hard objects or hit CRT surface.

4-2. Wipe off the dust softly with a dry soft cloth.

Do not use acid cleaner, alkaline cleaner, and solvent thinner.

Use water, alcohol, neutral glass cleaner or detergent when stain cannot be removed with drying cloth.

If the stain sticks to CRT surface, be quick to take out the stain from CRT.

4-3. Be careful not to damage or scratch CRT surface with a hard foreign object, etc. while cleaning.

TROUBLE SHOOTING

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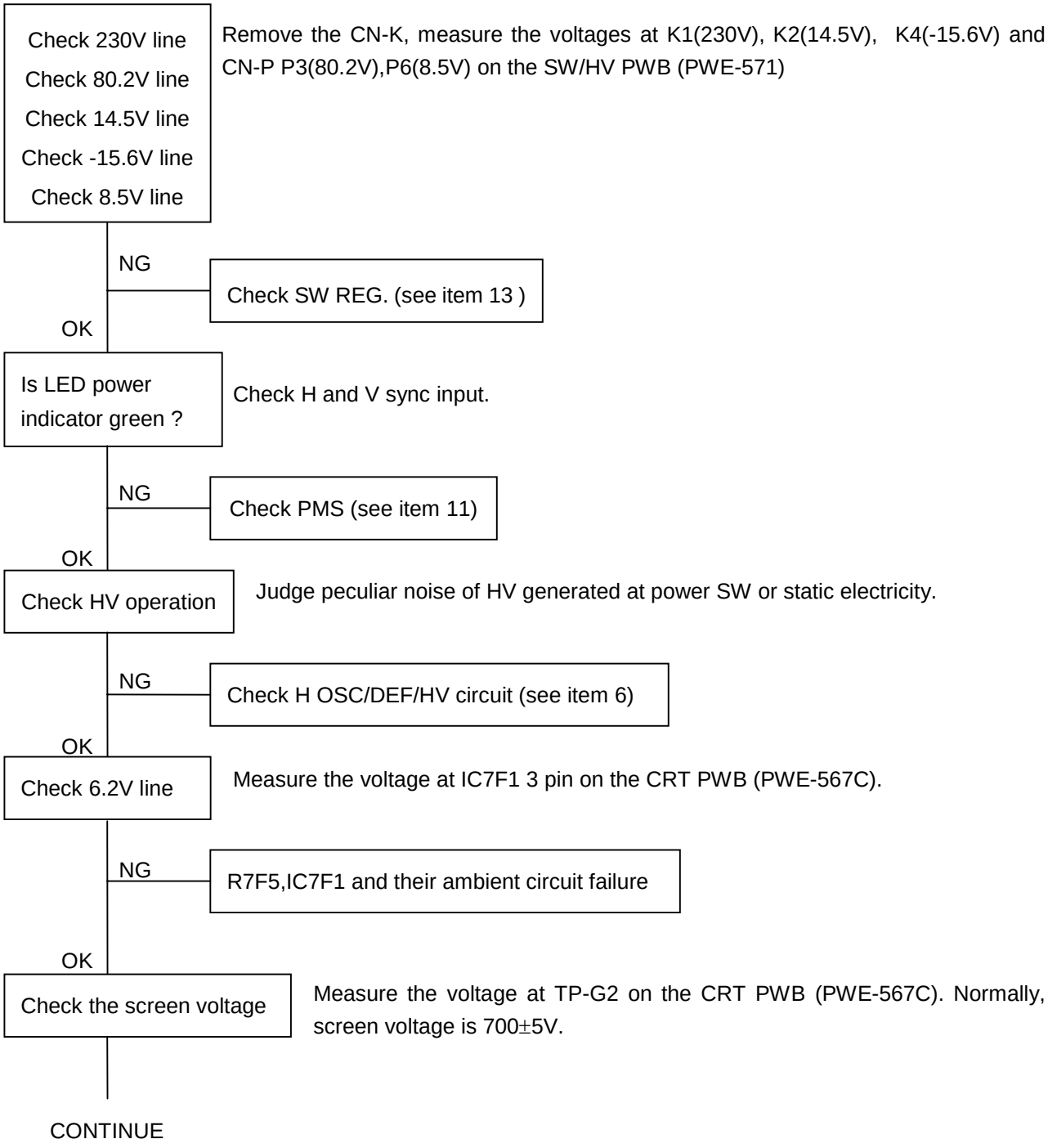
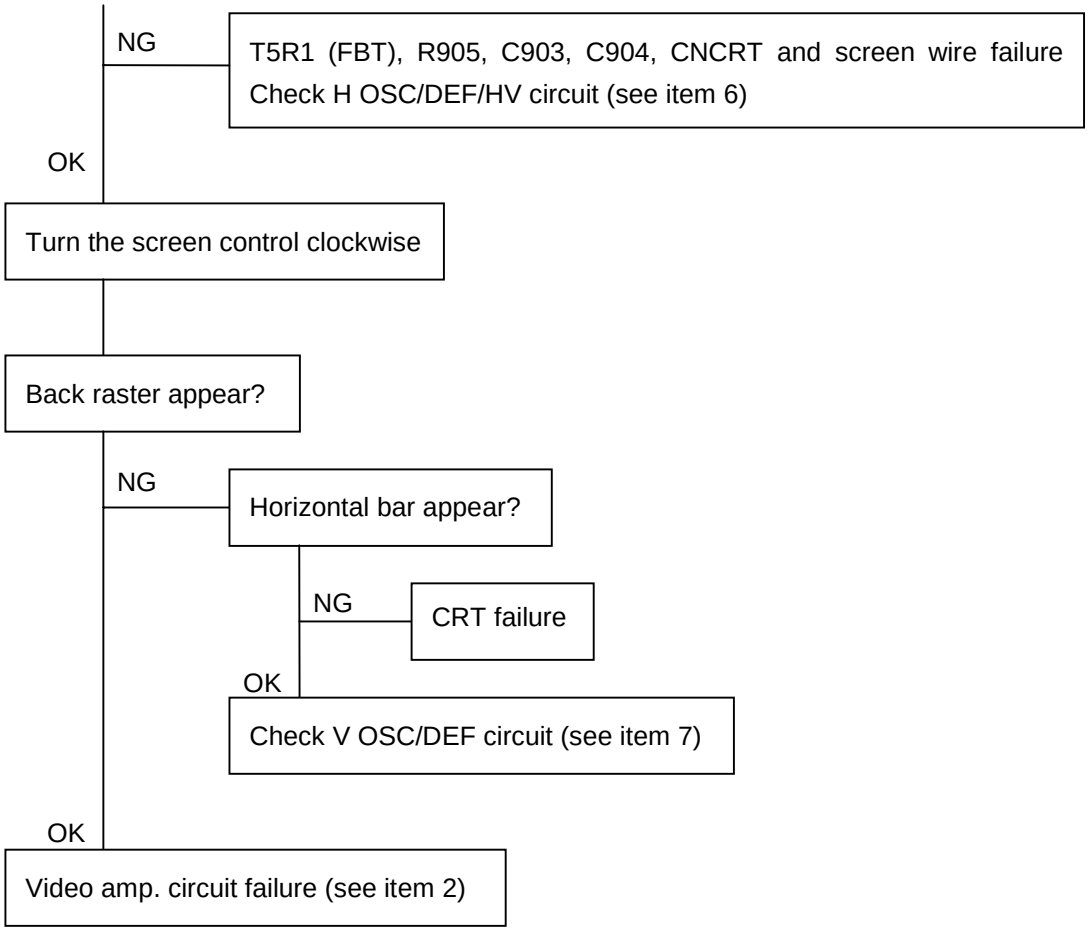
1. NO RASTER


Check 230V line
Check 80.2V line
Check 14.5V line
Check -15.6V line
Check 8.5V line
Remove the CN-K, measure the voltages at K1(230V), K2(14.5V), K4(-15.6V) and CN-P P3(80.2V),P6(8.5V) on the SW/HV PWB (PWE-571)
NG
Check SW REG. (see item 13)
OK
Is LED power indicator green ?
Check H and V sync input.
NG
Check PMS (see item 11)
OK
Check HV operation
Judge peculiar noise of HV generated at power SW or static electricity.
NG
Check H OSC/DEF/HV circuit (see item 6)
OK
Check 6.2V line
Measure the voltage at IC7F1 3 pin on the CRT PWB (PWE-567C).
NG
R7F5,IC7F1 and their ambient circuit failure
OK
Check the screen voltage
Measure the voltage at TP-G2 on the CRT PWB (PWE-567C). Normally, screen voltage is 700±5V.
CONTINUE

CONTINUE


NG
T5R1 (FBT), R905, C903, C904, CNCRT and screen wire failure
Check H OSC/DEF/HV circuit (see item 6)
OK
Turn the screen control clockwise
Back raster appear?
NG
Horizontal bar appear?
NG
CRT failure
OK
Check V OSC/DEF circuit (see item 7)
OK
Video amp. circuit failure (see item 2)

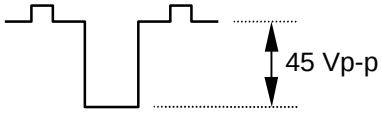
2. ABNORMAL VIDEO ON CRT SCREEN (too dark or too bright)

* Input 1/4 window pattern.

Set up BRIGHTNESS:preset, CONTRAST:max. and R/G/B control:all max. at OSM menu.

Check R/G/B video output

Measure R/G/B video outputs at TP-R, TP-G and TP-B on the CRT PWB (PWE-567C). Normally, R/G/B video output voltages are approx. 45Vp-p with 1/4 window pattern input when the contrast control of the OSM menu is MAX.



NG

Check IC721 output (VIDEO)

Measure the video output at IC721 pins 6(R), 14(G) and 4(B) on VIDEO PWB (PWE-567A). Normally, the wave form is same as upon figure.

OK

C729R/G/B failure, or CN-SG Failure.

NG

Check 80V line

Measure the voltage at CNP 3 on the VIDEO PWB(PWE-567A).

NG

CN-P failure, or check SW-REG (see item 13)

OK

Check Vbb line and 12V line

1) Check the voltage at C726 on the VIDEO PWB(PWE-567A). The voltage is approx. 9.1V_{DC}.
2) Check the voltage at R728 (reverse of ZD721) on the VIDEO PWB (PWE-567A). The voltage is approx. 12V_{DC}.

NG

1) ZD721, C726, R728 failure.
2) CN-AF failure.

OK

Check IC721 input (VIDEO)

Measure the video input at IC721 pins 8(R), 12(G) and 2(B) on VIDEO PWB (PWE-567A). The voltage is approx. 5Vp-p.

OK

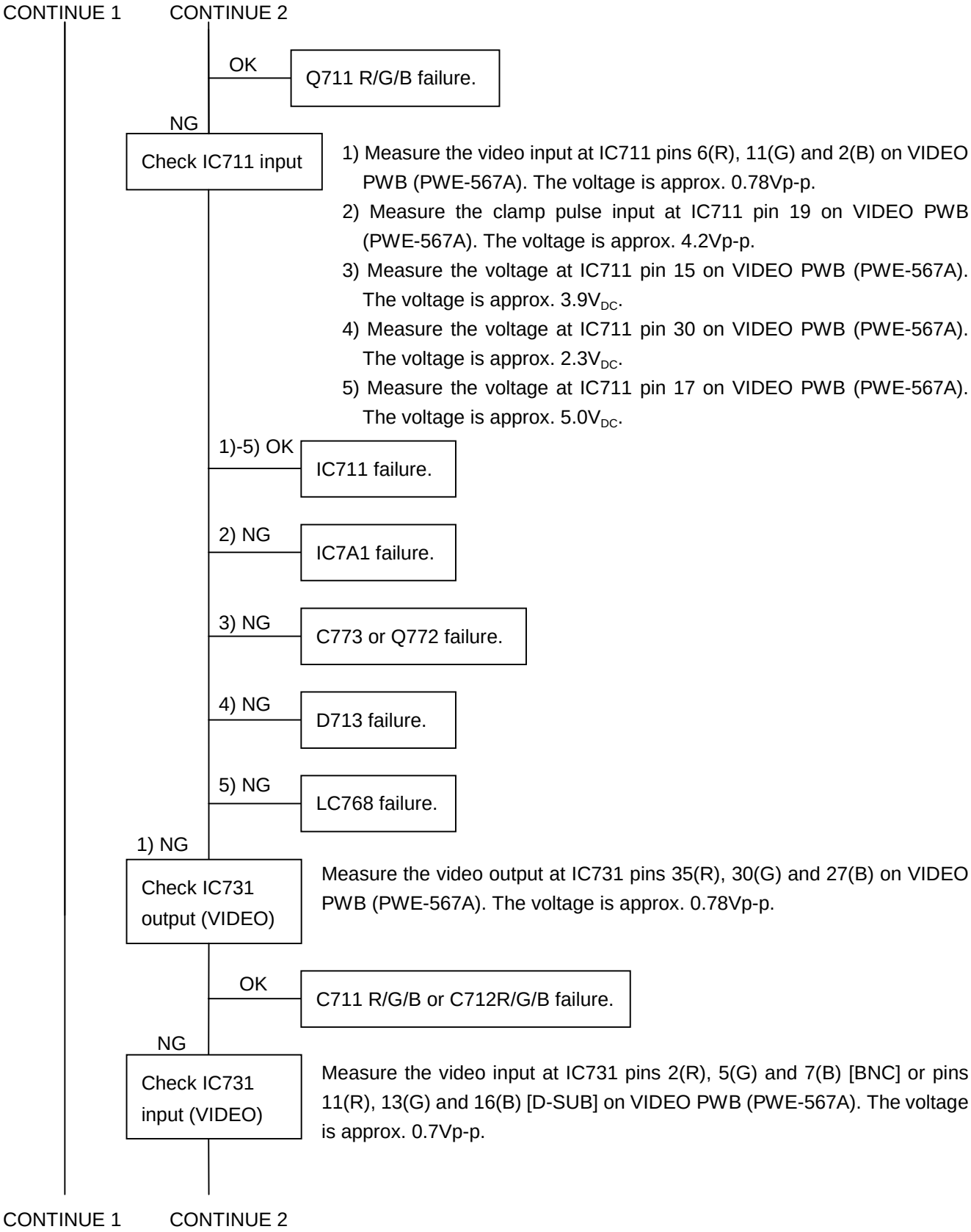
IC721 failure.

NG

Check IC711 output (VIDEO)

Measure the video output at IC711 pins 32(R), 29(G) and 35(B) on VIDEO PWB (PWE-567A). The voltage is approx. 3Vp-p.

CONTINUE 1 CONTINUE 2


CONTINUE 1
CONTINUE 2
OK
Q711 R/G/B failure.
NG
Check IC711 input
1) Measure the video input at IC711 pins 6(R), 11(G) and 2(B) on VIDEO PWB (PWE-567A). The voltage is approx. 0.78Vp-p.
2) Measure the clamp pulse input at IC711 pin 19 on VIDEO PWB (PWE-567A). The voltage is approx. 4.2Vp-p.
3) Measure the voltage at IC711 pin 15 on VIDEO PWB (PWE-567A). The voltage is approx. 3.9V$_{DC}$.
4) Measure the voltage at IC711 pin 30 on VIDEO PWB (PWE-567A). The voltage is approx. 2.3V$_{DC}$.
5) Measure the voltage at IC711 pin 17 on VIDEO PWB (PWE-567A). The voltage is approx. 5.0V$_{DC}$.
1)-5) OK
IC711 failure.
2) NG
IC7A1 failure.
3) NG
C773 or Q772 failure.
4) NG
D713 failure.
5) NG
LC768 failure.
1) NG
Check IC731 output (VIDEO)
Measure the video output at IC731 pins 35(R), 30(G) and 27(B) on VIDEO PWB (PWE-567A). The voltage is approx. 0.78Vp-p.
OK
C711 R/G/B or C712R/G/B failure.
NG
Check IC731 input (VIDEO)
Measure the video input at IC731 pins 2(R), 5(G) and 7(B) [BNC] or pins 11(R), 13(G) and 16(B) [D-SUB] on VIDEO PWB (PWE-567A). The voltage is approx. 0.7Vp-p.
CONTINUE 1
CONTINUE 2

CONTINUE 1 CONTINUE 2

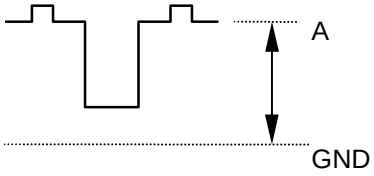
OK → IC731 failure.

NG

BNC: LC761R/G/B, C701R/G/B, C702R/G/B or MD701R/G/B failure.
D-SUB: LC762R/G/B, C703R/G/B, C704R/G/B or MD702R/G/B failure.

Check R/G/B cathode voltage video output

Measure R/G/B cathode voltages at TP-R, TP-G and TP-B on the CRT PWB (PWE-567C). Normally, the DC voltage is between approx. $80V_{DC}$ and $150V_{DC}$ at point A when BRIGHTNESS is preset. The DC voltage moves 15V or 20V when BRIGHTNESS changes from min. to max..



NG → **Check the power supply voltage of clamp circuit**

Measure the voltage at C747 on the VIDEO PWB (PWB-567A). The voltage is approx. 230V.

NG → LC76A, LC76N or CNP failure.

OK

D741 R/G/B, Q741R/G/B, IC742 or IC751 failure.

OK

Check the screen voltage

Measure the voltage at TP-G2 on the CRT PWB (PWB-567C). Normally, the screen voltage is $700\pm15V_{DC}$. Adjust $700\pm5V_{DC}$ if it is different.

NG

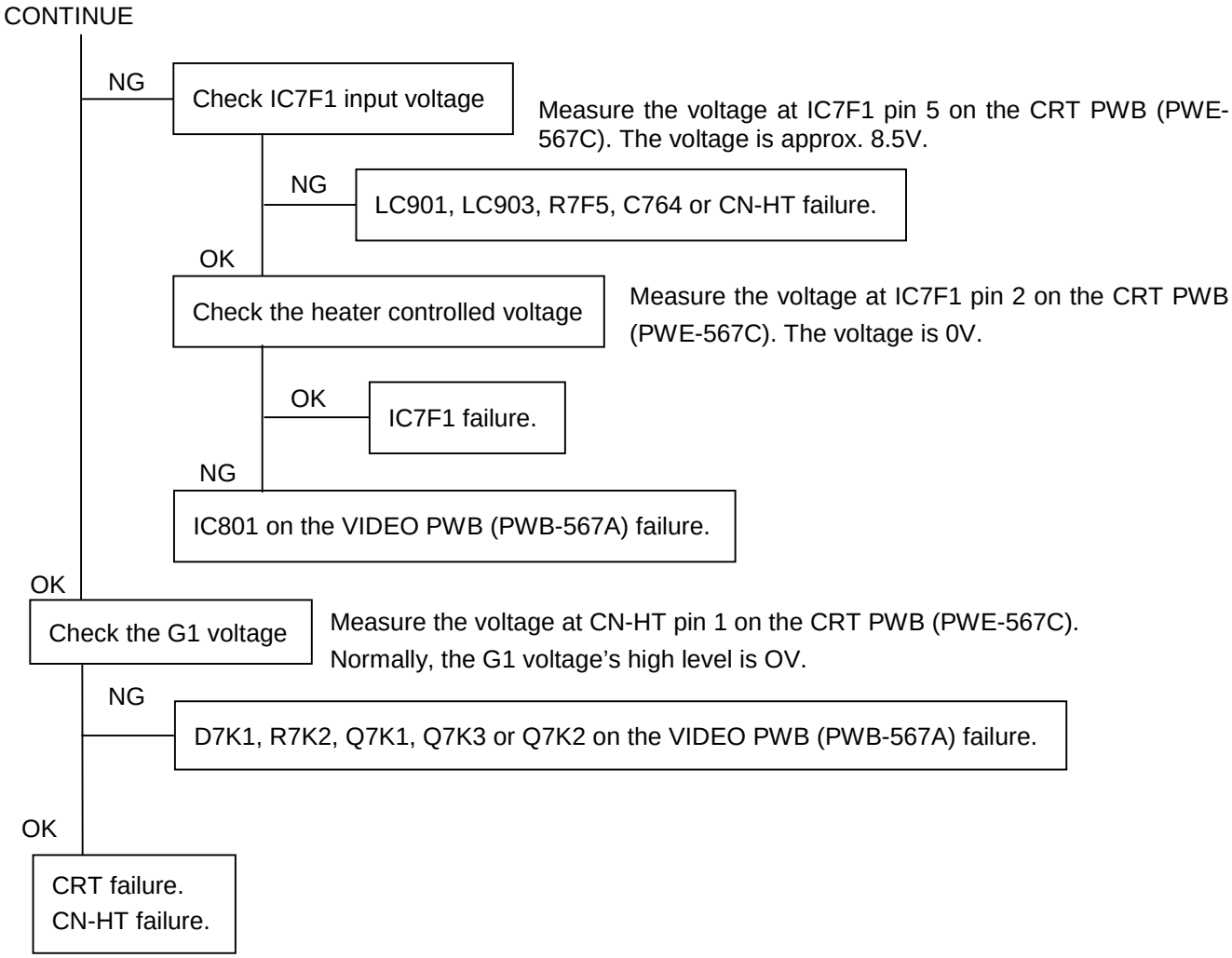
- R905, C903, C904 or CNCRT on the CRT PWB (PWB-567C), T5R1 (FBT) on the SW/HV PWB (PWB-571) or screen wire failure.
- Check H OSC/DEF/HV circuit (see item 6)

OK

Check the heater voltage

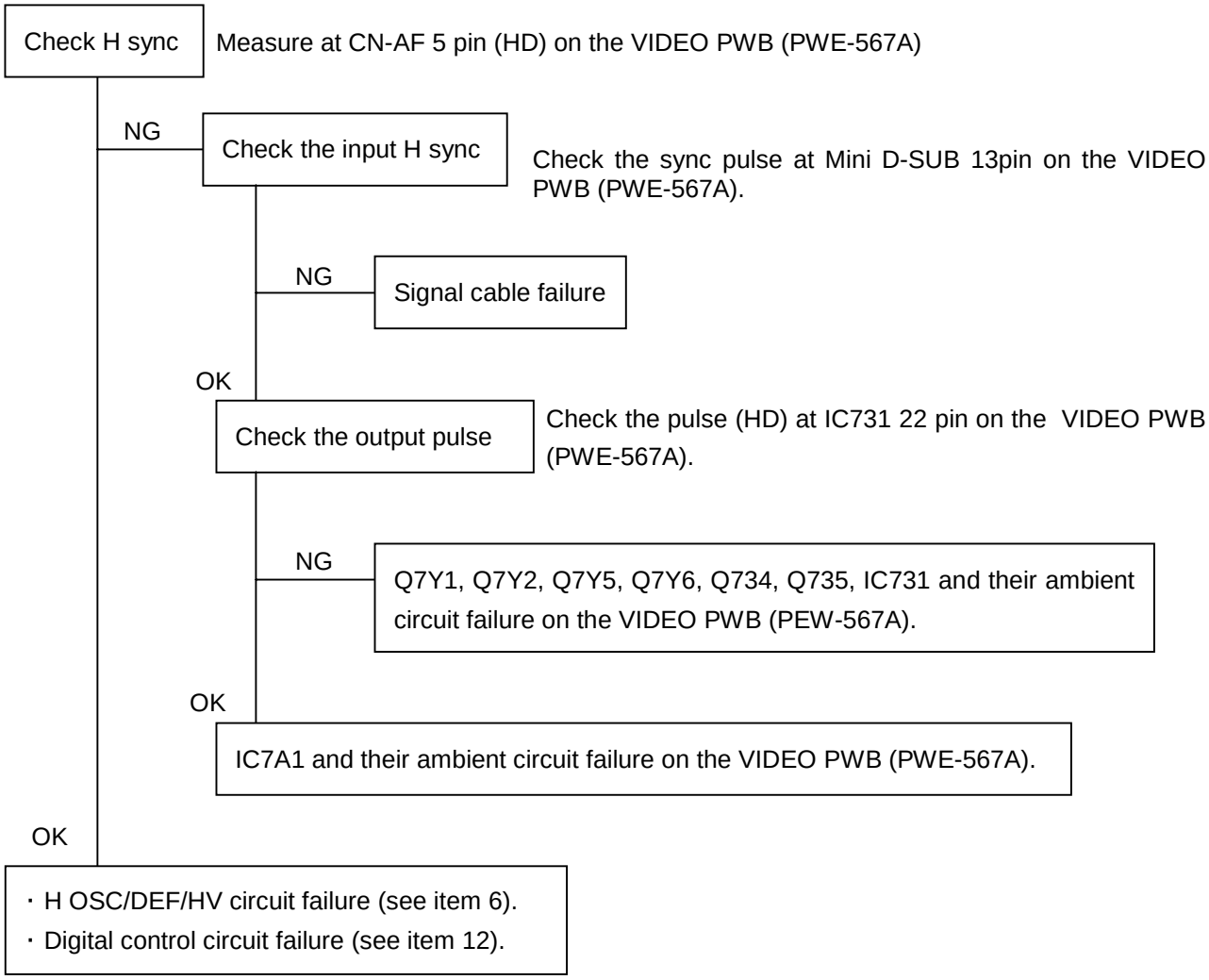
Measure the voltage at IC7F1 pin 3 on the CRT PWB (PWE-567C). The voltage is approx. 6.2V.

CONTINUE

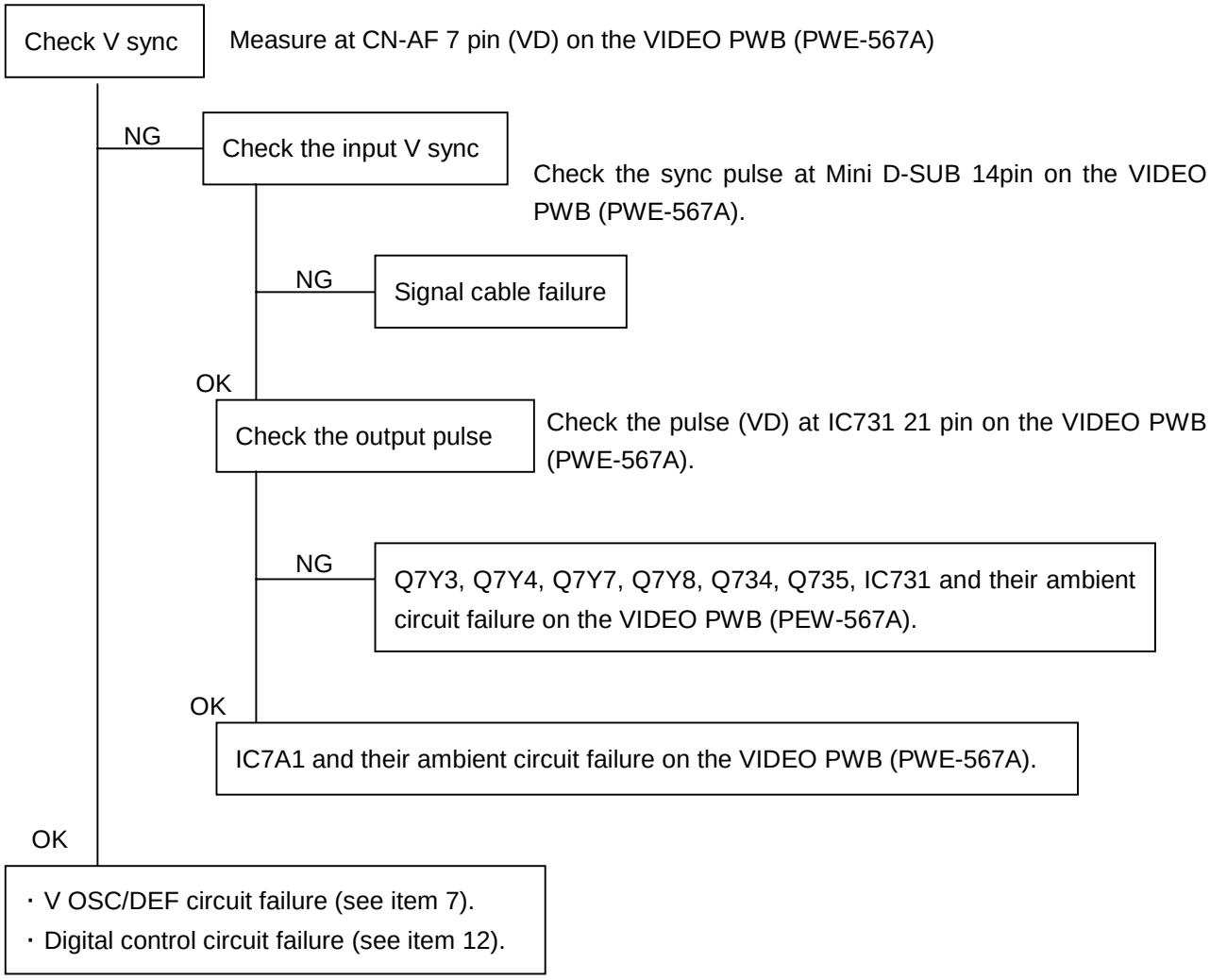

CONTINUE
NG
Check IC7F1 input voltage
Measure the voltage at IC7F1 pin 5 on the CRT PWB (PWE-567C). The voltage is approx. 8.5V.
NG
LC901, LC903, R7F5, C764 or CN-HT failure.
OK
Check the heater controlled voltage
Measure the voltage at IC7F1 pin 2 on the CRT PWB (PWE-567C). The voltage is 0V.
OK
IC7F1 failure.
NG
IC801 on the VIDEO PWB (PWB-567A) failure.
OK
Check the G1 voltage
Measure the voltage at CN-HT pin 1 on the CRT PWB (PWE-567C). Normally, the G1 voltage's high level is OV.
NG
D7K1, R7K2, Q7K1, Q7K3 or Q7K2 on the VIDEO PWB (PWB-567A) failure.
OK
CRT failure.
CN-HT failure.

3. UNSTABLE PICTURE

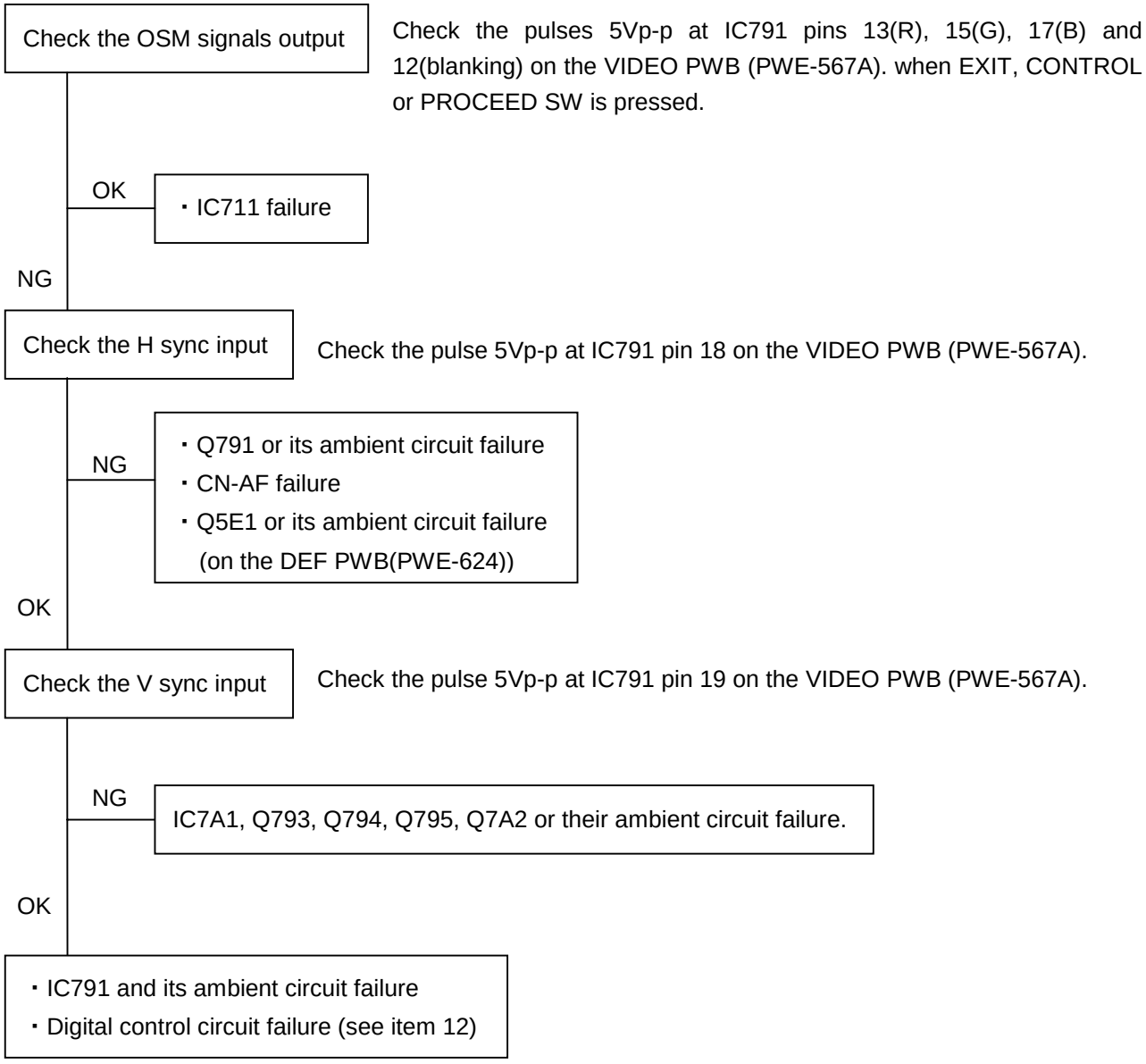
3-1.Horizontal


Check H sync
Measure at CN-AF 5 pin (HD) on the VIDEO PWB (PWE-567A)
NG
Check the input H sync
Check the sync pulse at Mini D-SUB 13pin on the VIDEO PWB (PWE-567A).
NG
Signal cable failure
OK
Check the output pulse
Check the pulse (HD) at IC731 22 pin on the VIDEO PWB (PWE-567A).
NG
Q7Y1, Q7Y2, Q7Y5, Q7Y6, Q734, Q735, IC731 and their ambient circuit failure on the VIDEO PWB (PEW-567A).
OK
IC7A1 and their ambient circuit failure on the VIDEO PWB (PWE-567A).
OK
・H OSC/DEF/HV circuit failure (see item 6).
・Digital control circuit failure (see item 12).

3-2.Vertical


Check V sync
Measure at CN-AF 7 pin (VD) on the VIDEO PWB (PWE-567A)
NG
Check the input V sync
Check the sync pulse at Mini D-SUB 14pin on the VIDEO PWB (PWE-567A).
NG
Signal cable failure
OK
Check the output pulse
Check the pulse (VD) at IC731 21 pin on the VIDEO PWB (PWE-567A).
NG
Q7Y3, Q7Y4, Q7Y7, Q7Y8, Q734, Q735, IC731 and their ambient circuit failure on the VIDEO PWB (PEW-567A).
OK
IC7A1 and their ambient circuit failure on the VIDEO PWB (PWE-567A).
OK
・V OSC/DEF circuit failure (see item 7).
・Digital control circuit failure (see item 12).

4. ON SCREEN MANAGER (OSM) FAILURE


Check the OSM signals output
Check the pulses 5Vp-p at IC791 pins 13(R), 15(G), 17(B) and 12(blanking) on the VIDEO PWB (PWE-567A). when EXIT, CONTROL or PROCEED SW is pressed.
OK
・IC711 failure
NG
Check the H sync input
Check the pulse 5Vp-p at IC791 pin 18 on the VIDEO PWB (PWE-567A).
NG
・Q791 or its ambient circuit failure
・CN-AF failure
・Q5E1 or its ambient circuit failure
(on the DEF PWB(PWE-624))
OK
Check the V sync input
Check the pulse 5Vp-p at IC791 pin 19 on the VIDEO PWB (PWE-567A).
NG
IC7A1, Q793, Q794, Q795, Q7A2 or their ambient circuit failure.
OK
・IC791 and its ambient circuit failure
・Digital control circuit failure (see item 12)

5. ABNORMAL PICTURE

5-1. Horizontal Size

Check HV voltage

Measure the voltage at CRT anode.

Normally, the voltage is approx. 27kV.

NG → HV circuit failure (see item 6)

OK

Check 8.5V line

Check the voltage at CNP pin 6 on the VIDEO PWB (PWE-567A).

NG → SW REG. failure (see item 13)

OK

Check the voltage which is supplied to CPU

NG → IC801, IC802, IC8G1, IC7A1or their ambient circuit failure

OK

Check the horizontal frequency mode output (IC571 pins 4～7、10～12) See Fig. 5.1.1

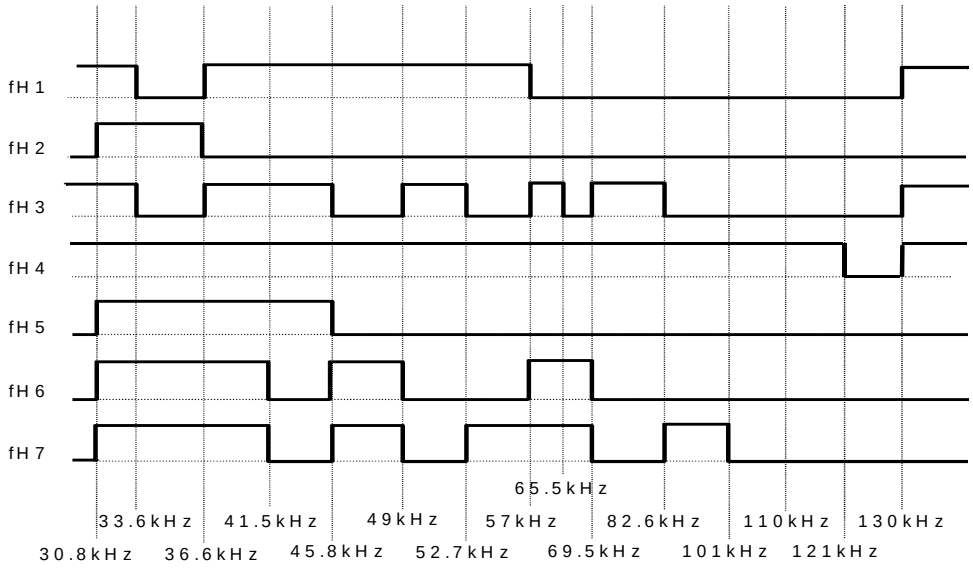


Fig 5.1.1

CONTINUE

CONTINUE

NG → IC571 failure

OK

Check S-correction capacitor Switching circuit

Check the operation of MQ571, Q572, Q573.

NG → MQ571, Q572, Q573 failure

OK

Check whether IC592 pin 1 on DEF PWB and IC531 pin 5 vary by horizontal size control in OSD menu or not

Measure the voltage at IC592 pin 1 and IC531 pin 12.
Normally, pin 1 voltage varies from approx. 3.5V to 5V and pin 5 voltage varies from approx. 0.9V to 5V.

NG → Digital control circuit or IC592 failure

OK

Check Q561 FBP
See Fig 5.1.2

Measure the voltage at Q561 Collector.
Normally, this voltage varies from 850 to 1200V by H-SIZE control for user.

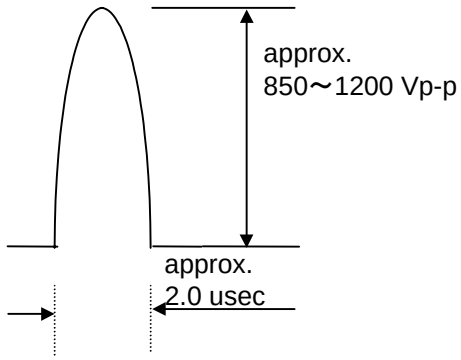


Fig 5.1.2

NG → Q561, D561, D562, C561, H-DY or their ambient circuit failure

OK

Check the distortion correction circuit (see item 5-6)

OK

H OSC/DEF/HV circuit failure (see item 6)

5-2. Vertical Size

Check whether the amplitude (approx. 6Vp-p~10Vp-p) at CN-DSB pin 12 on the DEF PWB (PWE-624) varies by OSD vertical size control or not ?

NG

・IC501 or IC511 failure.
・Digital control circuit failure. (see item 12)

OK

Check whether the amplitude (approx. 6Vp-p~10Vp-p) at IC421 8 pin on the DEF PWB (PWE-624) varies by OSD vertical size control or not ?

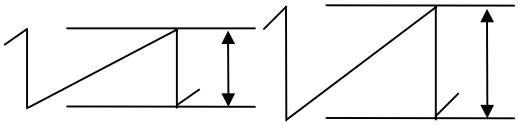
NG

・IC421 or its ambient circuit failure.

OK

V OSC/DEF circuit failure. (see item 7)

v. saw wave



v. size min.
Approx. 6Vp-p

v. size max.
Approx.10Vp-p

5-3. Horizontal Position

Check the raster position.

NG

Raster centering circuit failure.

OK

・IC501 failure.
・Q504, Q505 or their ambient circuit failure.
・Digital control circuit failure. (see item 12)

5-4. Vertical Position

Check whether the DC voltages level at CN-DSB pin 12 on the DEF PWB (PWE-624) varies by OSD vertical position control or not?

NG
- IC501 failure.
- Digital control circuit failure. (see item 12)

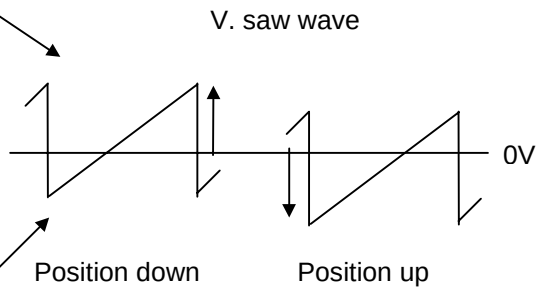
OK

Check whether the DC voltages level at IC421 pin 8 on the DEF PWB (PWE-624) varies by OSD vertical position control or not?

NG
- IC421 or its ambient circuit failure.

OK

- IC401, VDY or their ambient circuit failure.



5-5. Poor Linearity

5-5-1. Horizontal

Check an item 5-1.

OK

T571, Q571, IC591、IC532(pin 17) or their ambient circuit failure.

5-5-2. Vertical

Check if the vertical linearity on the screen varies by OSD 'VERTICAL LINEARITY' and 'VERTICAL LINEARITY BALANCE'.

NG
- IC501 failure.
- Digital control circuit failure. (see item 12)

OK

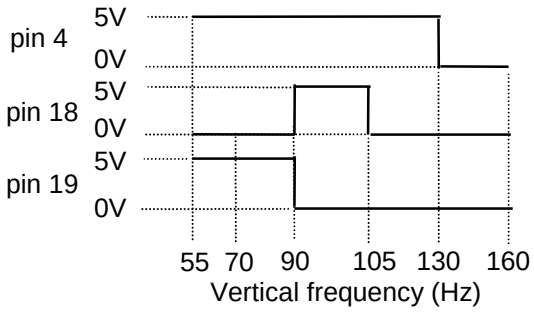
Check the D/A converter output. (IC532 pin 4,18,19)

NG
- IC532 or its ambient circuit failure.
- Digital control circuit failure. (see item 12)

OK

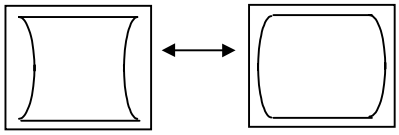
- Q421, Q422, Q423 or their ambient circuit failure.
- IC421 or its ambient circuit failure.

Check the voltage at IC532 pin 4,18 and 19.
The output voltages of each pin are as follows.



5-6. Distortion Correction Circuit

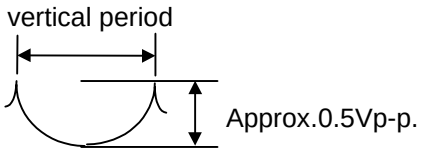
Check whether the distortion on the screen varies by OSD distortion correction control (SIDEPIN) or not ?



Sidepin - Sidepin +

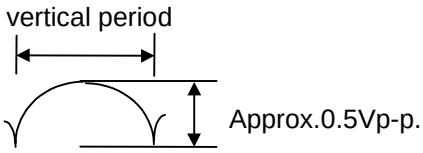
NG

Check the waveform at CN-DSB pin 11 is present.



NG

Check the waveform at IC511 pin 5.



NG

・IC501, R544 or C524 failure.
・Digital control circuit failure (see item 12)

OK

IC511 or its ambient circuit failure.

OK

Check the waveform at IC5GA pin 3.

NG

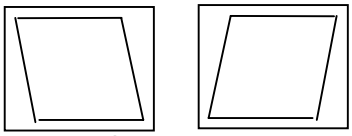
IC5GA or its ambient circuit failure.

OK

IC5A1, Q5A1 or their ambient circuit failure.

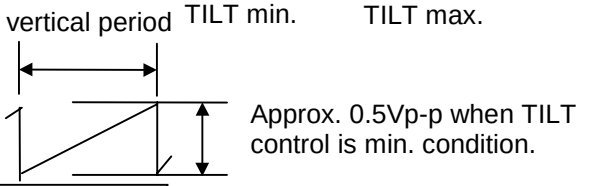
OK

Check whether the distortion on the screen varies by OSD distortion correction control (TILT) or not ?



NG

Check the waveform at C519.



NG

IC501, R526 or C519 failure.

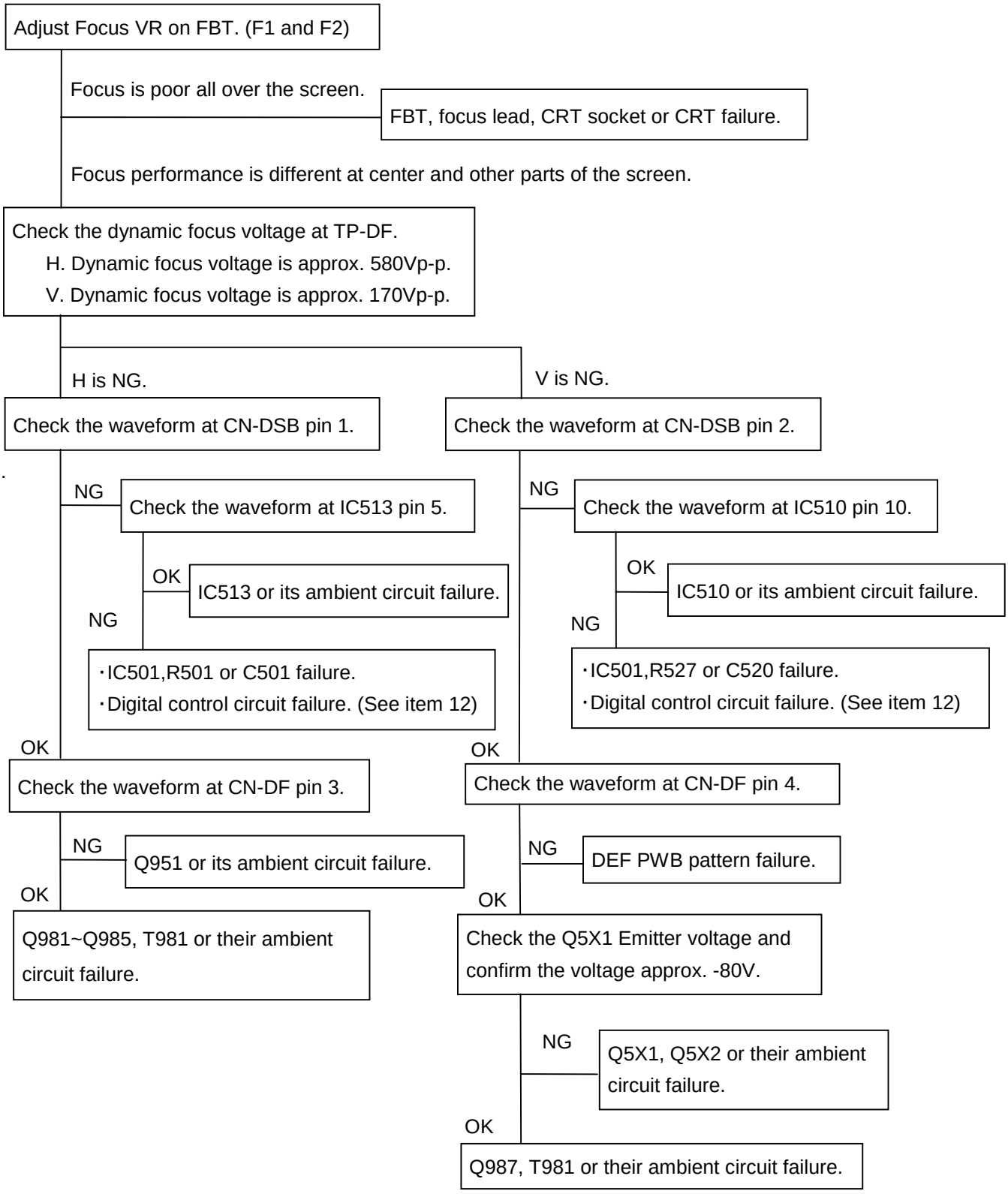
OK

IC511 or its ambient circuit failure.

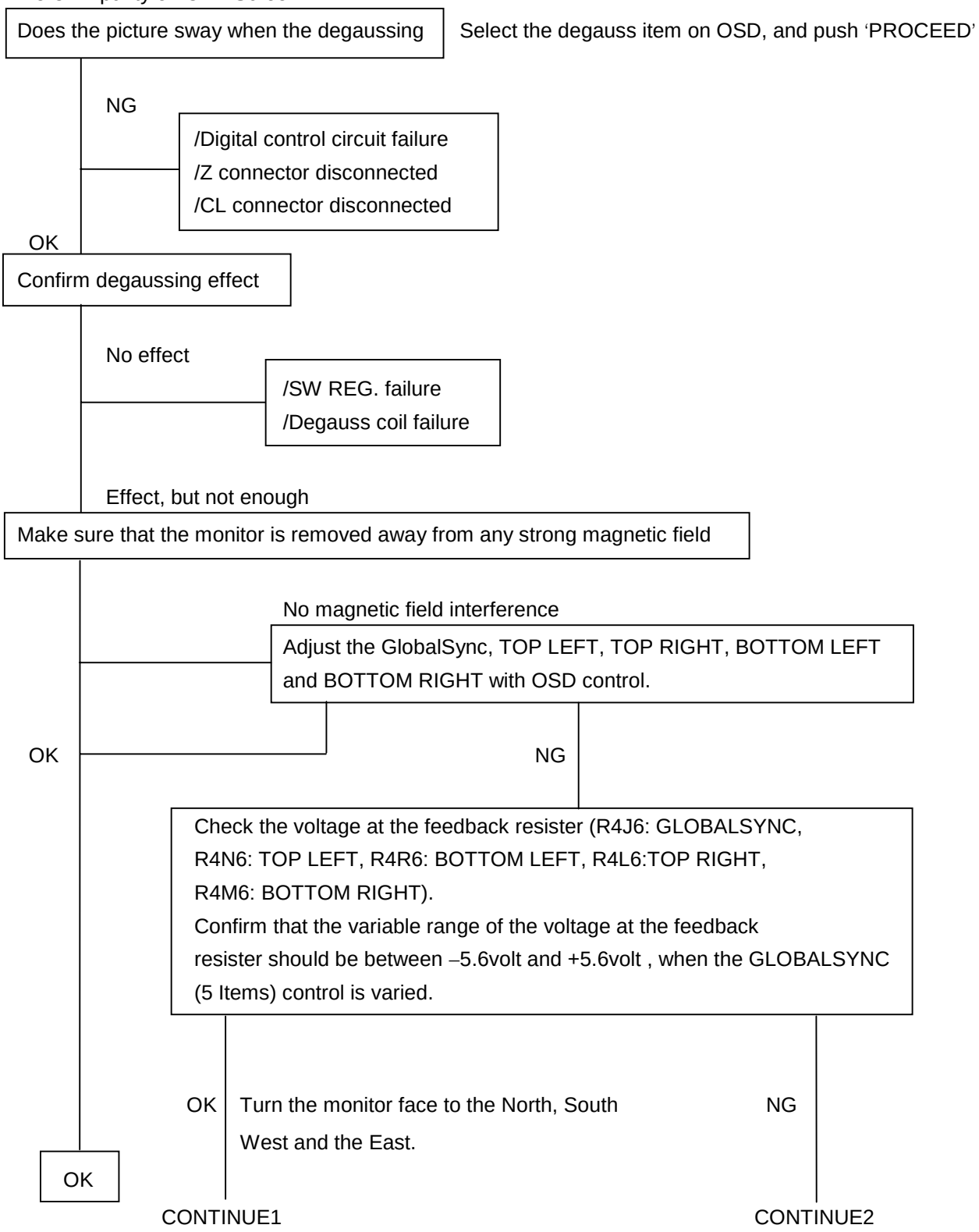
OK

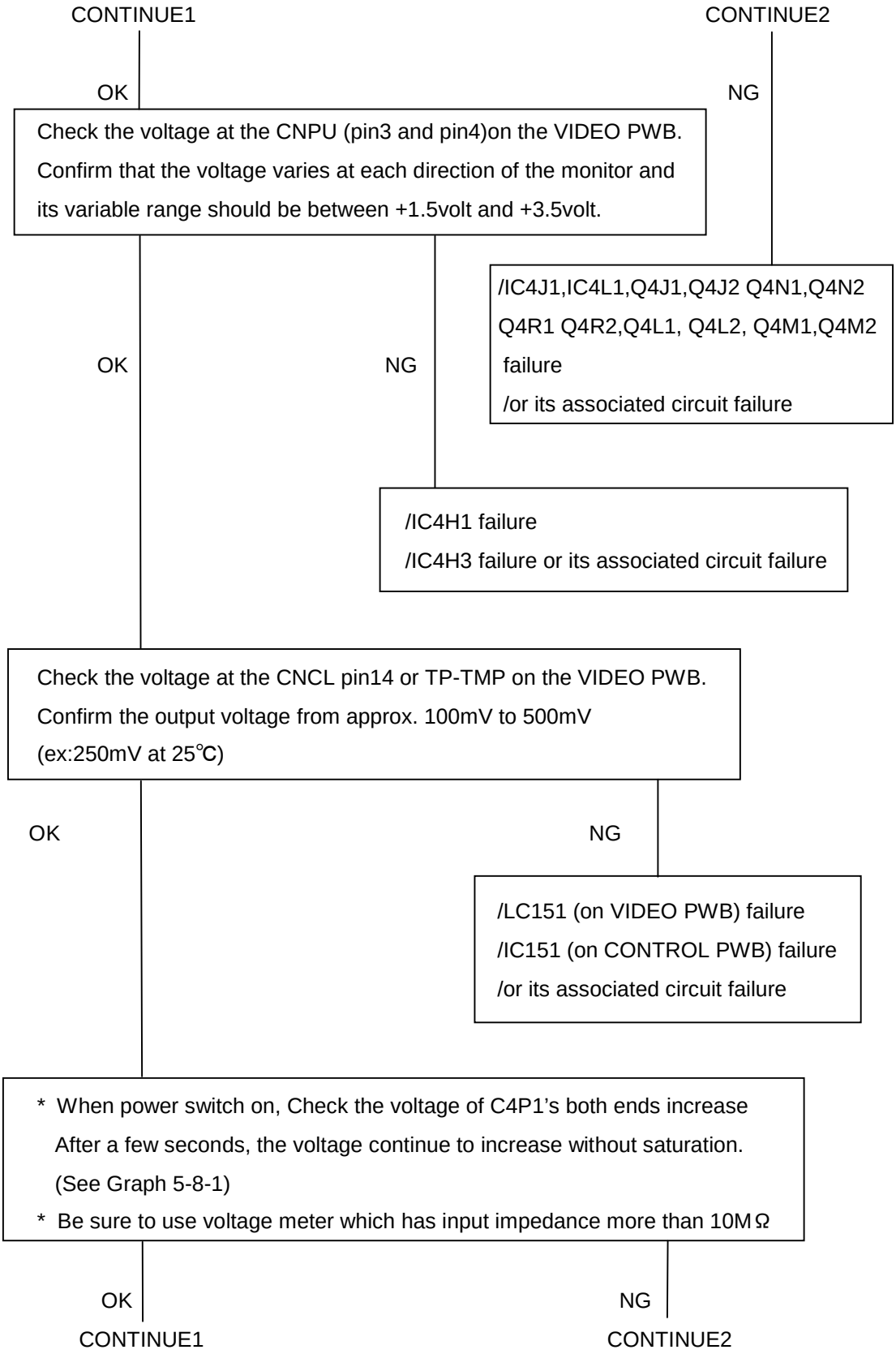
H OSC/DEF/HV circuit failure. (see item 6)

5-7. Poor Focus


Adjust Focus VR on FBT. (F1 and F2)
Focus is poor all over the screen.
FBT, focus lead, CRT socket or CRT failure.
Focus performance is different at center and other parts of the screen.
Check the dynamic focus voltage at TP-DF.
H. Dynamic focus voltage is approx. 580Vp-p.
V. Dynamic focus voltage is approx. 170Vp-p.
H is NG.
V is NG.
Check the waveform at CN-DSB pin 1.
Check the waveform at CN-DSB pin 2.
NG
Check the waveform at IC513 pin 5.
OK
IC513 or its ambient circuit failure.
NG
・IC501,R501 or C501 failure.
・Digital control circuit failure. (See item 12)
NG
Check the waveform at IC510 pin 10.
OK
IC510 or its ambient circuit failure.
NG
・IC501,R527 or C520 failure.
・Digital control circuit failure. (See item 12)
OK
Check the waveform at CN-DF pin 3.
OK
Check the waveform at CN-DF pin 4.
NG
Q951 or its ambient circuit failure.
NG
DEF PWB pattern failure.
OK
Q981~Q985, T981 or their ambient circuit failure.
OK
Check the Q5X1 Emitter voltage and confirm the voltage approx. -80V.
NG
Q5X1, Q5X2 or their ambient circuit failure.
OK
Q987, T981 or their ambient circuit failure.

5-8. Impurity on CRT Screen


Does the picture sway when the degaussing
Select the degauss item on OSD, and push 'PROCEED'
NG
/Digital control circuit failure
/Z connector disconnected
/CL connector disconnected
OK
Confirm degaussing effect
No effect
/SW REG. failure
/Degauss coil failure
Effect, but not enough
Make sure that the monitor is removed away from any strong magnetic field
No magnetic field interference
Adjust the GlobalSync, TOP LEFT, TOP RIGHT, BOTTOM LEFT and BOTTOM RIGHT with OSD control.
OK
NG
Check the voltage at the feedback resister (R4J6: GLOBALSYNC, R4N6: TOP LEFT, R4R6: BOTTOM LEFT, R4L6:TOP RIGHT, R4M6: BOTTOM RIGHT).
Confirm that the variable range of the voltage at the feedback resister should be between –5.6volt and +5.6volt , when the GLOBALSYNC (5 Items) control is varied.
OK
Turn the monitor face to the North, South West and the East.
NG
OK
CONTINUE1
CONTINUE2


CONTINUE1
CONTINUE2
OK
NG
Check the voltage at the CNPU (pin3 and pin4)on the VIDEO PWB.
Confirm that the voltage varies at each direction of the monitor and
its variable range should be between +1.5volt and +3.5volt.
/IC4J1,IC4L1,Q4J1,Q4J2 Q4N1,Q4N2
Q4R1 Q4R2,Q4L1, Q4L2, Q4M1,Q4M2
failure
/or its associated circuit failure
OK
NG
/IC4H1 failure
/IC4H3 failure or its associated circuit failure
Check the voltage at the CNCL pin14 or TP-TMP on the VIDEO PWB.
Confirm the output voltage from approx. 100mV to 500mV
(ex:250mV at 25℃)
OK
NG
/LC151 (on VIDEO PWB) failure
/IC151 (on CONTROL PWB) failure
/or its associated circuit failure
* When power switch on, Check the voltage of C4P1's both ends increase
After a few seconds, the voltage continue to increase without saturation.
(See Graph 5-8-1)
* Be sure to use voltage meter which has input impedance more than 10MΩ
OK
NG
CONTINUE1
CONTINUE2

CONTINUE1

OK

CONTINUE2

NG

/Q4P1, Q4P3, MD4P1
/or its associated circuit failure

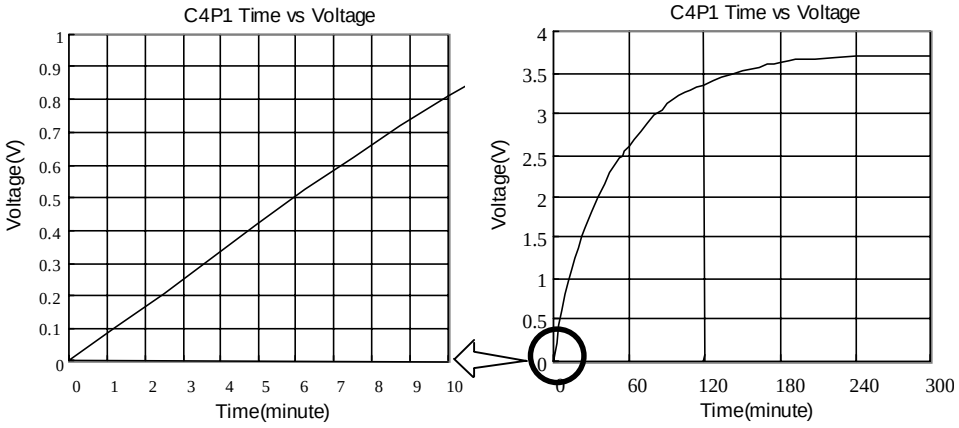
* When power switch on too, Check the voltage of IC801 pin 51 increase at approx. C4P1 voltage (See Graph 5-8-1) + 0.5V
* Be sure to use voltage meter which has input impedance more than 10MΩ

OK

CRT, DY failure

NG

/Q4P4, D4P1, MD4P2, R4P7
/or its associated circuit failure



Graph 5-8-1: C4P1 Voltage

6. H OSC / DEF / HV CIRCUIT FAILURE

Check the horizontal drive pulse.

Check the drive pulse at CN-DSB pin 10 on the DEF PWB(PWE-624) outputs a rectangle waveform which amplitude is 4.3Vp-p.

OK

Check the waveform of IC592 pin 3.

Normally, it is sawtooth wave which amplitude is approx. 5Vp-p.

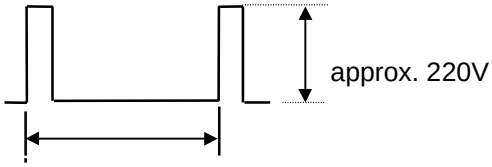
NG

IC592 or its ambient circuit failure.

OK

Check the waveform of gate at Q5G1.

Be sure to get the L5G2 off the DEF PWB, and output as following.



NG

Q5G1, ZD5G1, D5G2 or their ambient circuit failure.

Note: Q561, Q5G1 and Q5A1 will short out at the same time.

OK

Check the voltage for horizontal drive circuit.

Measure the voltage at Q553 collector.
Normally, it is approx. 15V.

NG

R557 failure

OK

Check the AFC pulse at R5E1.

Normally, its amplitude is approx. 50Vp-p~60Vp-p.

NG

Q555, Q561, T551, T561 or their ambient circuit failure.

OK

Check high voltage.

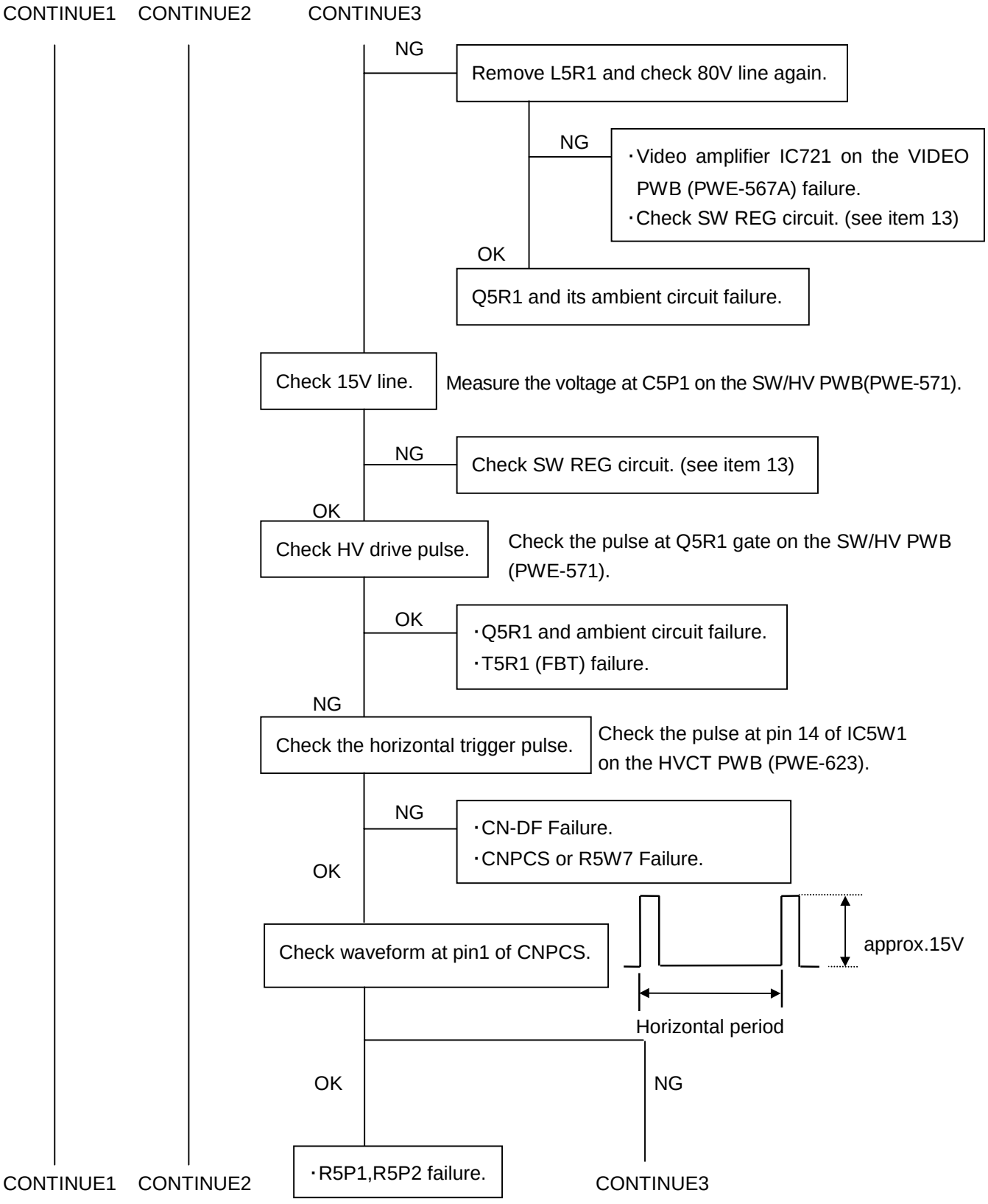
Measure the CRT anode voltage.
Normally, high voltage is approx. 27kV.

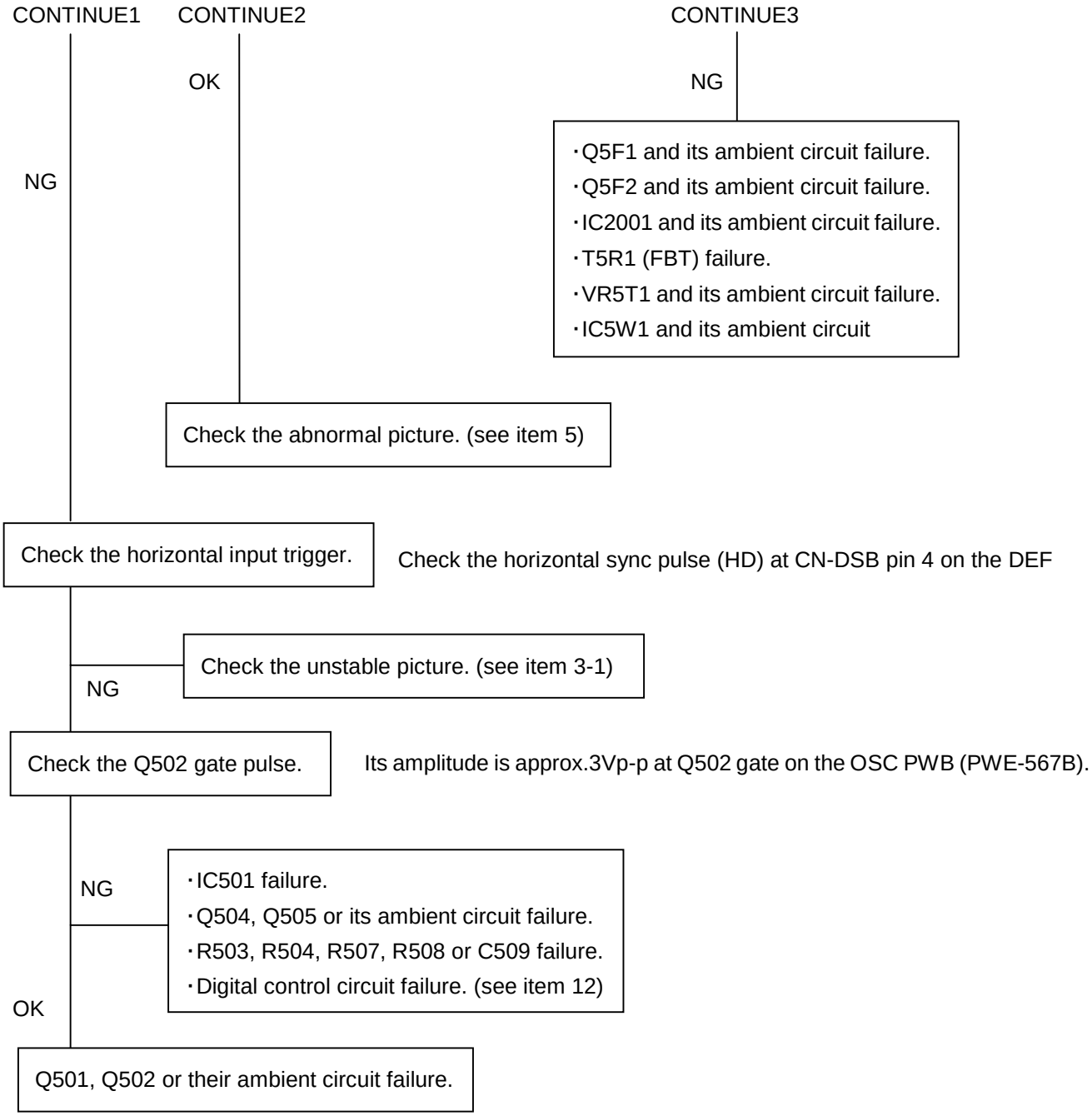
NG

Check 80V line.

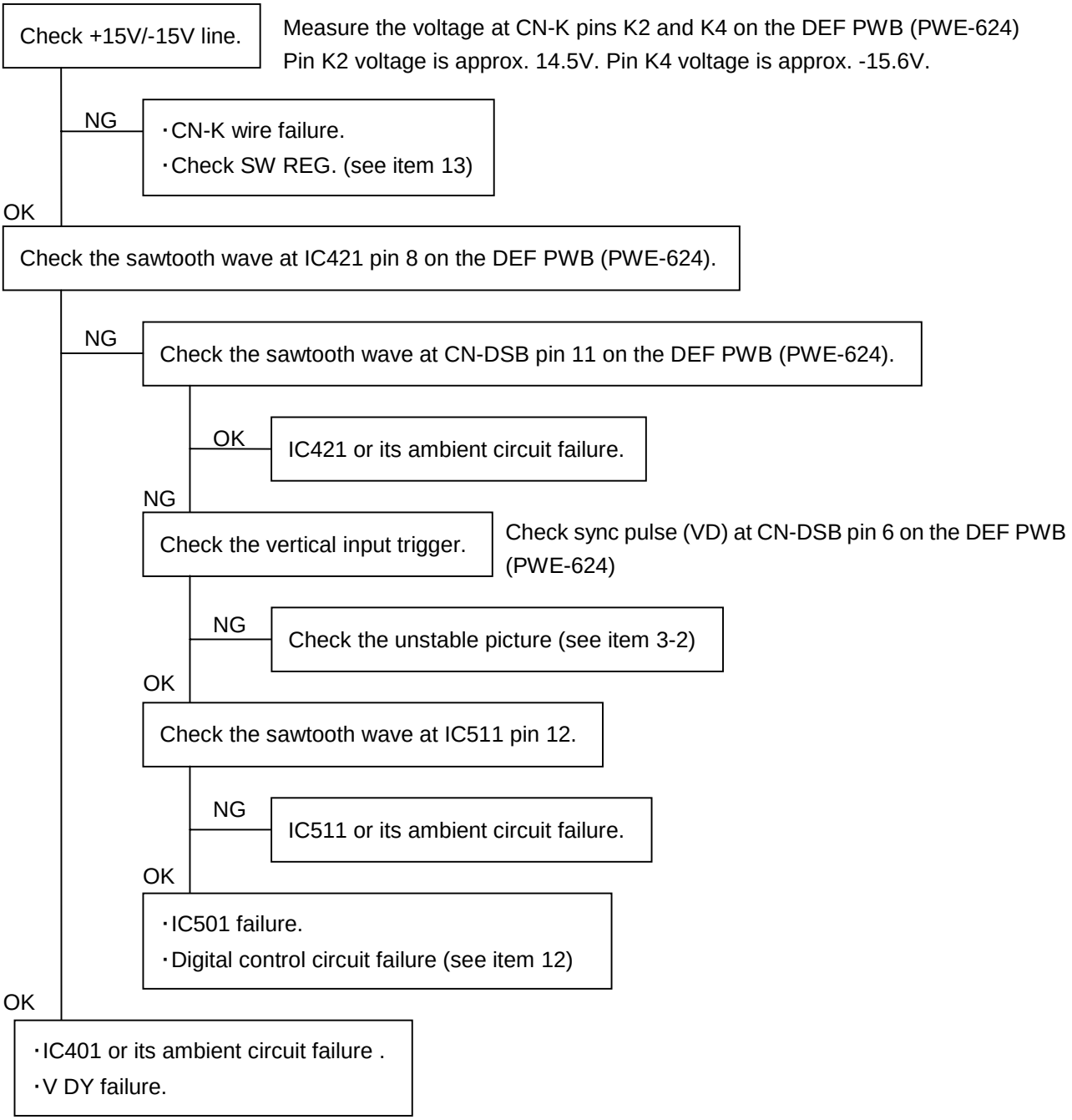
Measure the voltage at CN-P pin 3 on the SW/HV PWB (PWE-571).

CONTINUE1 CONTINUE2 CONTINUE3

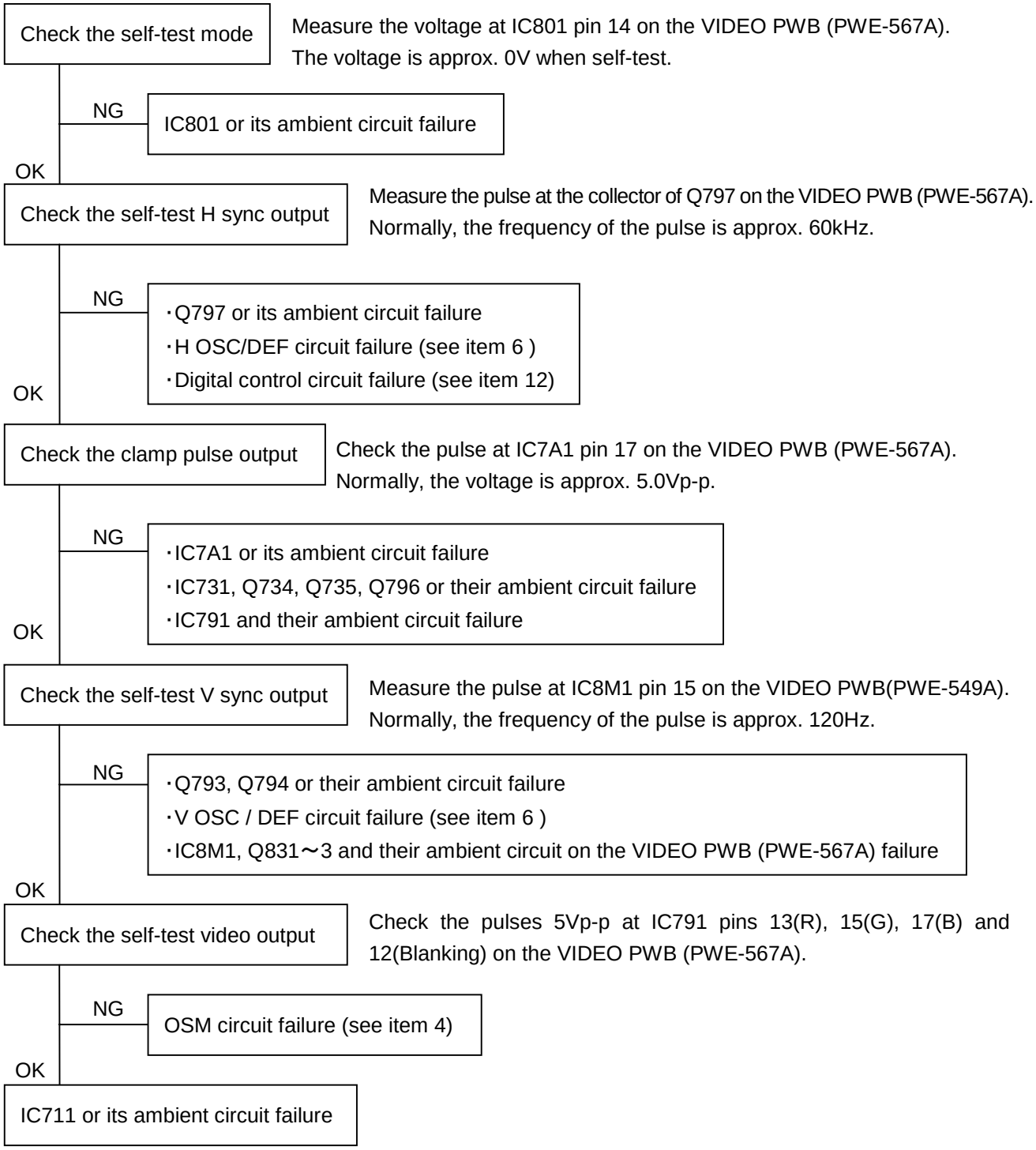

CONTINUE1
CONTINUE2
CONTINUE3
NG
Remove L5R1 and check 80V line again.
NG
・Video amplifier IC721 on the VIDEO PWB (PWE-567A) failure.
・Check SW REG circuit. (see item 13)
OK
Q5R1 and its ambient circuit failure.
Check 15V line.
Measure the voltage at C5P1 on the SW/HV PWB(PWE-571).
NG
Check SW REG circuit. (see item 13)
OK
Check HV drive pulse.
Check the pulse at Q5R1 gate on the SW/HV PWB (PWE-571).
OK
・Q5R1 and ambient circuit failure.
・T5R1 (FBT) failure.
NG
Check the horizontal trigger pulse.
Check the pulse at pin 14 of IC5W1 on the HVCT PWB (PWE-623).
NG
・CN-DF Failure.
・CNPCS or R5W7 Failure.
OK
Check waveform at pin1 of CNPCS.
approx.15V
Horizontal period
OK
NG
・R5P1,R5P2 failure.
CONTINUE1
CONTINUE2
CONTINUE3


CONTINUE1
CONTINUE2
CONTINUE3
OK
NG
NG
・Q5F1 and its ambient circuit failure.
・Q5F2 and its ambient circuit failure.
・IC2001 and its ambient circuit failure.
・T5R1 (FBT) failure.
・VR5T1 and its ambient circuit failure.
・IC5W1 and its ambient circuit
Check the abnormal picture. (see item 5)
Check the horizontal input trigger.
Check the horizontal sync pulse (HD) at CN-DSB pin 4 on the DEF
Check the unstable picture. (see item 3-1)
NG
Check the Q502 gate pulse.
Its amplitude is approx.3Vp-p at Q502 gate on the OSC PWB (PWE-567B).
NG
・IC501 failure.
・Q504, Q505 or its ambient circuit failure.
・R503, R504, R507, R508 or C509 failure.
・Digital control circuit failure. (see item 12)
OK
Q501, Q502 or their ambient circuit failure.

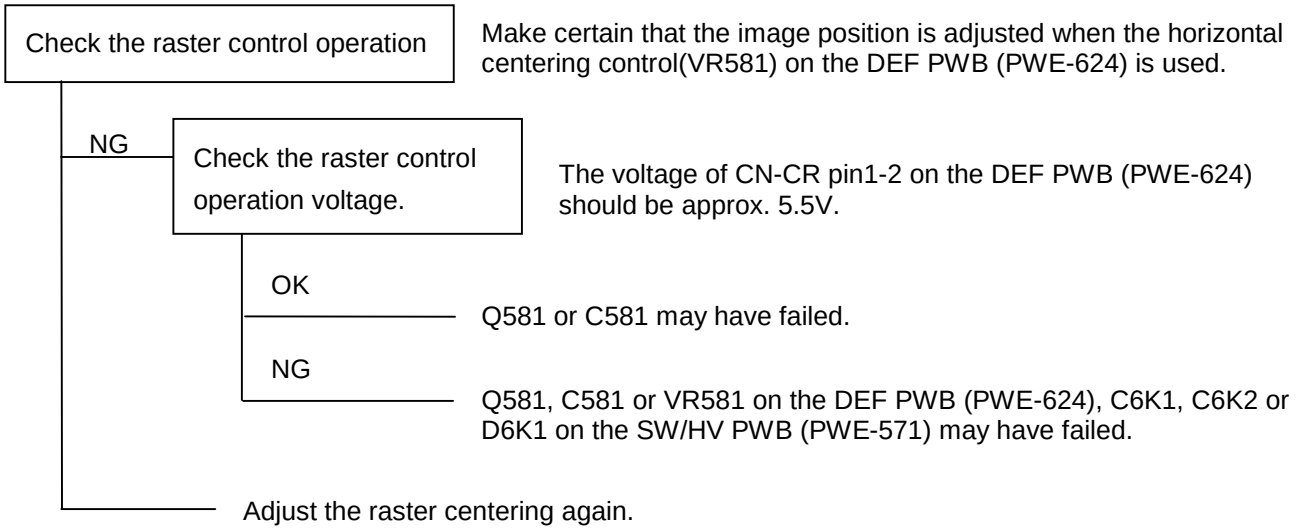
7. V OSC / DEF CIRCUIT FAILURE


Check +15V/-15V line.
Measure the voltage at CN-K pins K2 and K4 on the DEF PWB (PWE-624)
Pin K2 voltage is approx. 14.5V. Pin K4 voltage is approx. -15.6V.
NG
・CN-K wire failure.
・Check SW REG. (see item 13)
OK
Check the sawtooth wave at IC421 pin 8 on the DEF PWB (PWE-624).
NG
Check the sawtooth wave at CN-DSB pin 11 on the DEF PWB (PWE-624).
OK
IC421 or its ambient circuit failure.
NG
Check the vertical input trigger.
Check sync pulse (VD) at CN-DSB pin 6 on the DEF PWB (PWE-624)
NG
Check the unstable picture (see item 3-2)
OK
Check the sawtooth wave at IC511 pin 12.
NG
IC511 or its ambient circuit failure.
OK
・IC501 failure.
・Digital control circuit failure (see item 12)
OK
・IC401 or its ambient circuit failure .
・V DY failure.

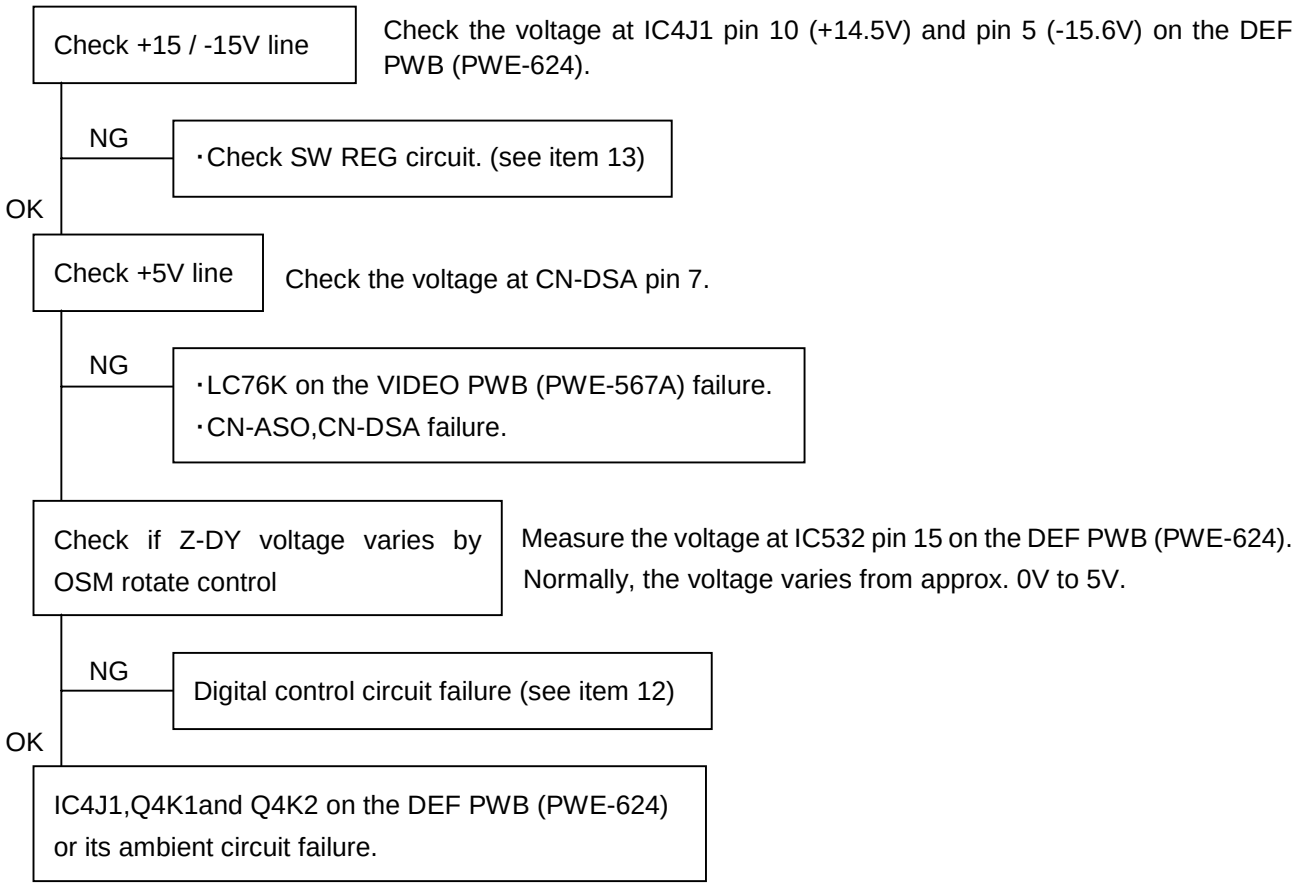
8. SELF TEST ERROR


Check the self-test mode
Measure the voltage at IC801 pin 14 on the VIDEO PWB (PWE-567A).
The voltage is approx. 0V when self-test.
NG
IC801 or its ambient circuit failure
OK
Check the self-test H sync output
Measure the pulse at the collector of Q797 on the VIDEO PWB (PWE-567A).
Normally, the frequency of the pulse is approx. 60kHz.
NG
・Q797 or its ambient circuit failure
・H OSC/DEF circuit failure (see item 6)
・Digital control circuit failure (see item 12)
OK
Check the clamp pulse output
Check the pulse at IC7A1 pin 17 on the VIDEO PWB (PWE-567A).
Normally, the voltage is approx. 5.0Vp-p.
NG
・IC7A1 or its ambient circuit failure
・IC731, Q734, Q735, Q796 or their ambient circuit failure
・IC791 and their ambient circuit failure
OK
Check the self-test V sync output
Measure the pulse at IC8M1 pin 15 on the VIDEO PWB(PWE-549A).
Normally, the frequency of the pulse is approx. 120Hz.
NG
・Q793, Q794 or their ambient circuit failure
・V OSC / DEF circuit failure (see item 6)
・IC8M1, Q831～3 and their ambient circuit on the VIDEO PWB (PWE-567A) failure
OK
Check the self-test video output
Check the pulses 5Vp-p at IC791 pins 13(R), 15(G), 17(B) and 12(Blanking) on the VIDEO PWB (PWE-567A).
NG
OSM circuit failure (see item 4)
OK
IC711 or its ambient circuit failure

9. RASTER CENTERING CIRCUIT FAILURE


Check the raster control operation
Make certain that the image position is adjusted when the horizontal centering control(VR581) on the DEF PWB (PWE-624) is used.
NG
Check the raster control operation voltage.
The voltage of CN-CR pin1-2 on the DEF PWB (PWE-624) should be approx. 5.5V.
OK
Q581 or C581 may have failed.
NG
Q581, C581 or VR581 on the DEF PWB (PWE-624), C6K1, C6K2 or D6K1 on the SW/HV PWB (PWE-571) may have failed.
Adjust the raster centering again.

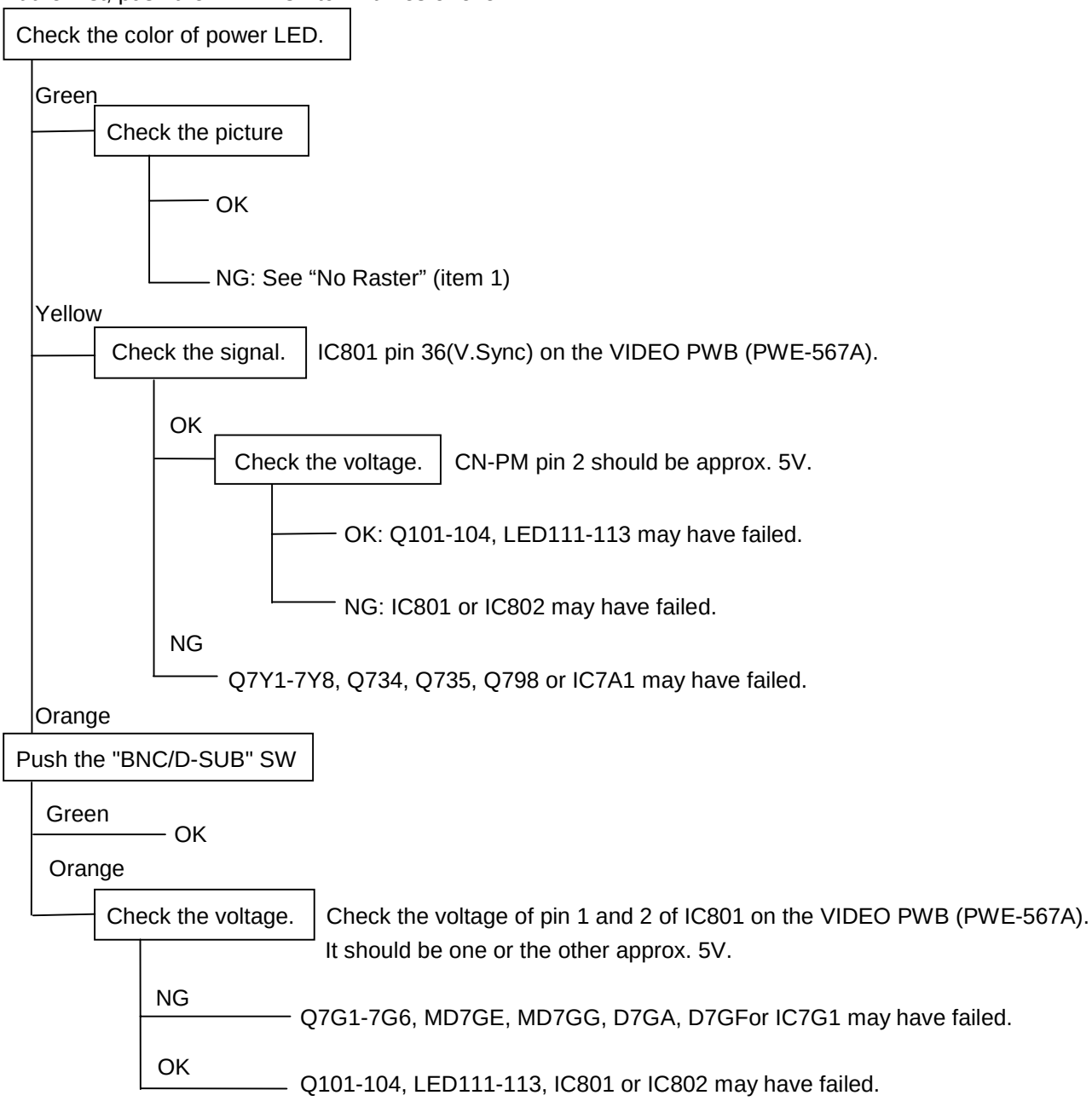
10. RASTER ROTATION ERROR


Check +15 / -15V line
Check the voltage at IC4J1 pin 10 (+14.5V) and pin 5 (-15.6V) on the DEF PWB (PWE-624).
NG
・Check SW REG circuit. (see item 13)
OK
Check +5V line
Check the voltage at CN-DSA pin 7.
NG
・LC76K on the VIDEO PWB (PWE-567A) failure.
・CN-ASO,CN-DSA failure.
Check if Z-DY voltage varies by OSM rotate control
Measure the voltage at IC532 pin 15 on the DEF PWB (PWE-624). Normally, the voltage varies from approx. 0V to 5V.
NG
Digital control circuit failure (see item 12)
OK
IC4J1,Q4K1and Q4K2 on the DEF PWB (PWE-624) or its ambient circuit failure.

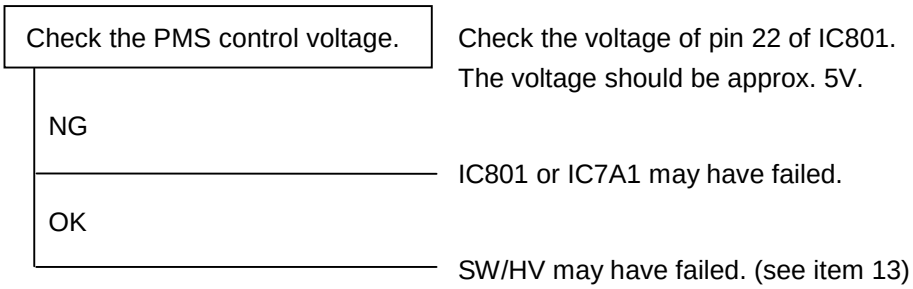
11. POWER MANAGEMENT SYSTEM (PMS) FAILURE

11-1. PMS FAILURE 1(When a monitor receives Horizontal and Vertical Sync.)

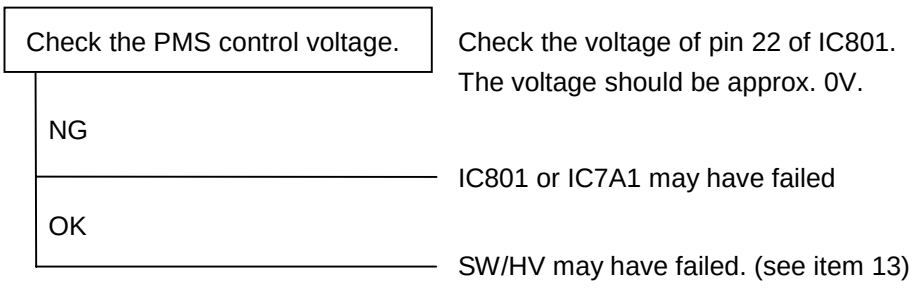
At the first, push the “EXIT” switch 2 times or over.


Check the color of power LED.
Green
Check the picture
OK
NG: See “No Raster” (item 1)
Yellow
Check the signal.
IC801 pin 36(V.Sync) on the VIDEO PWB (PWE-567A).
OK
Check the voltage.
CN-PM pin 2 should be approx. 5V.
OK: Q101-104, LED111-113 may have failed.
NG: IC801 or IC802 may have failed.
NG
Q7Y1-7Y8, Q734, Q735, Q798 or IC7A1 may have failed.
Orange
Push the "BNC/D-SUB" SW
Green
OK
Orange
Check the voltage.
Check the voltage of pin 1 and 2 of IC801 on the VIDEO PWB (PWE-567A).
It should be one or the other approx. 5V.
NG
Q7G1-7G6, MD7GE, MD7GG, D7GA, D7GFor IC7G1 may have failed.
OK
Q101-104, LED111-113, IC801 or IC802 may have failed.

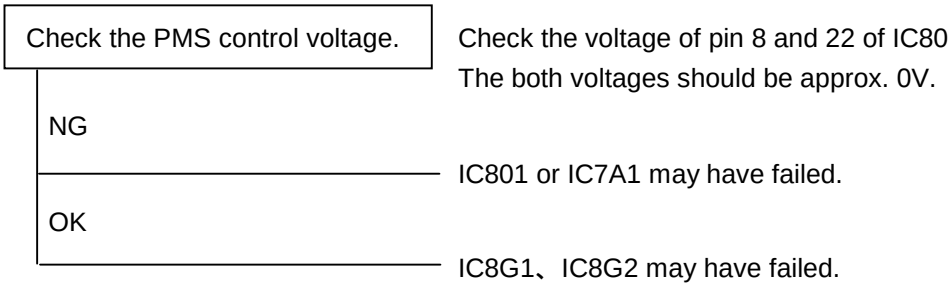
11-2. PMS FAILURE 2(When a monitor receives no Horizontal Sync)


Check the PMS control voltage.
Check the voltage of pin 22 of IC801.
The voltage should be approx. 5V.
NG
IC801 or IC7A1 may have failed.
OK
SW/HV may have failed. (see item 13)

11-3. PMS FAILURE 3(When a monitor receives no Vertical Sync)

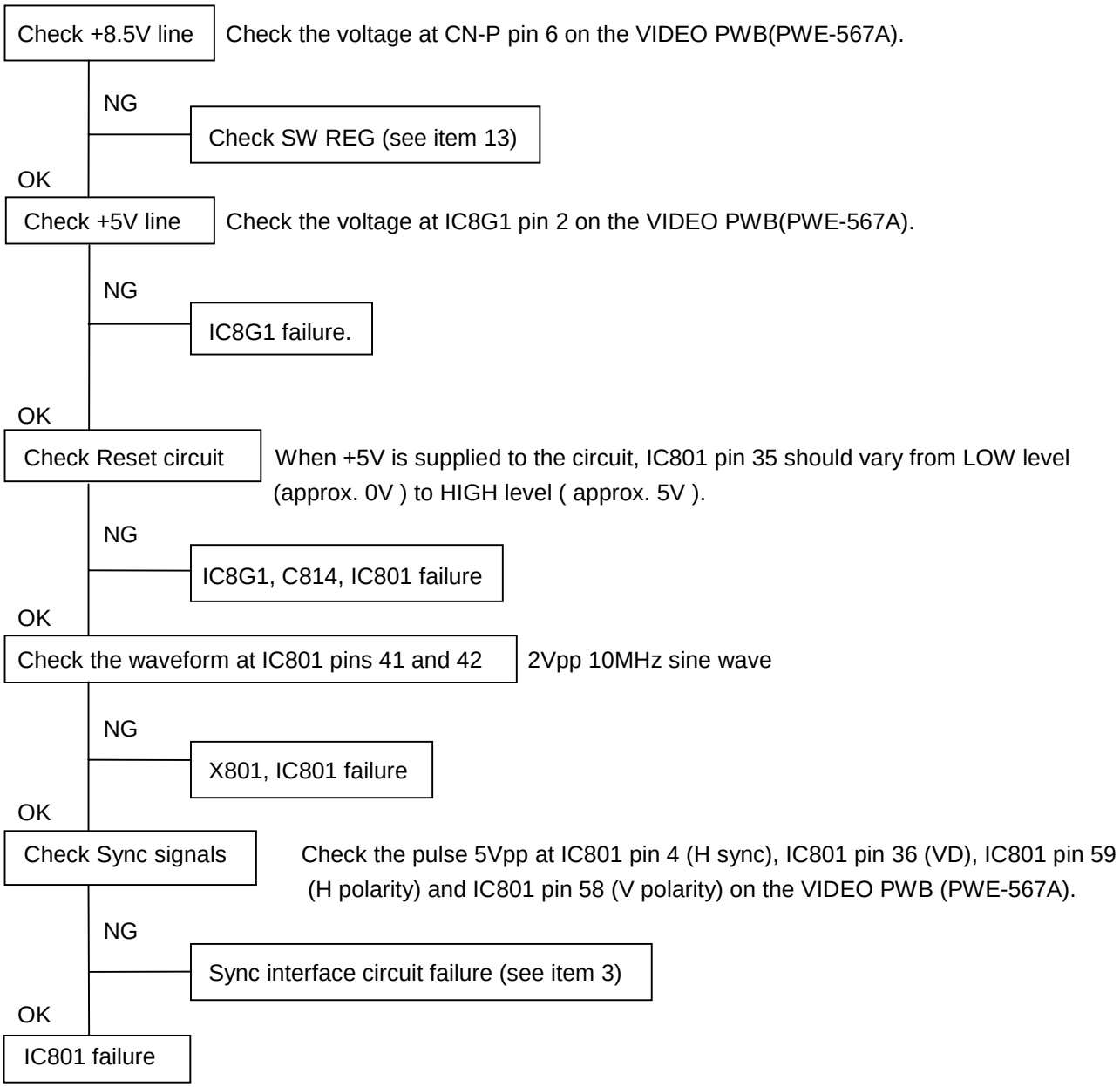

Check the PMS control voltage.
Check the voltage of pin 22 of IC801.
The voltage should be approx. 0V.
NG
IC801 or IC7A1 may have failed
OK
SW/HV may have failed. (see item 13)

11-4. PMS FAILURE 4(When monitor receives neither Horizontal nor Vertical Sync)

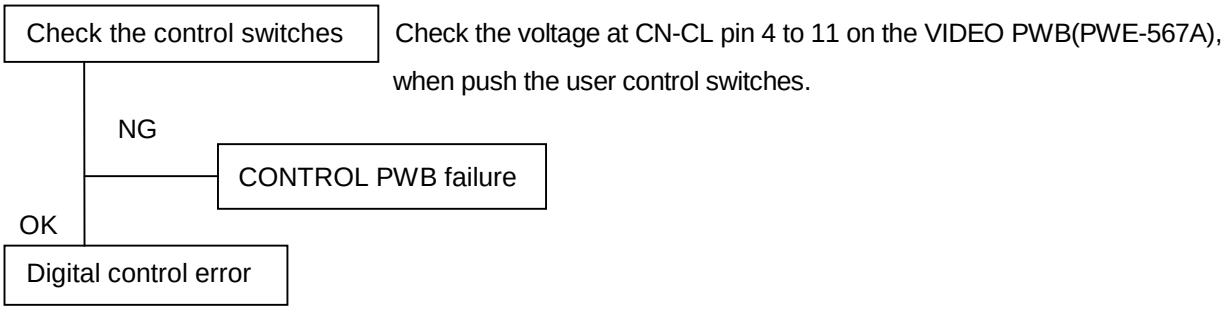

Check the PMS control voltage.
Check the voltage of pin 8 and 22 of IC801.
The both voltages should be approx. 0V.
NG
IC801 or IC7A1 may have failed.
OK
IC8G1、IC8G2 may have failed.

12. DIGITAL CONTROL CIRCUIT FAILURE

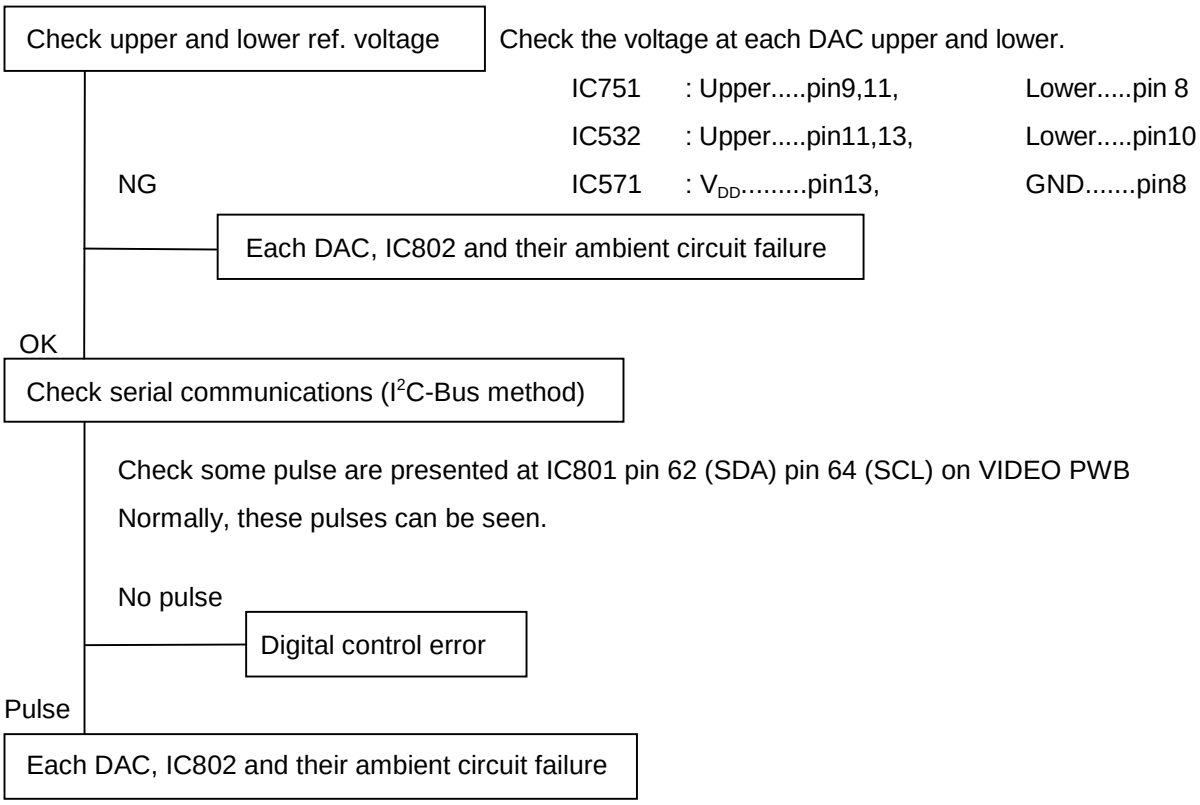
12-1. Digital control error


Check +8.5V line
Check the voltage at CN-P pin 6 on the VIDEO PWB(PWE-567A).
NG
Check SW REG (see item 13)
OK
Check +5V line
Check the voltage at IC8G1 pin 2 on the VIDEO PWB(PWE-567A).
NG
IC8G1 failure.
OK
Check Reset circuit
When +5V is supplied to the circuit, IC801 pin 35 should vary from LOW level (approx. 0V) to HIGH level (approx. 5V).
NG
IC8G1, C814, IC801 failure
OK
Check the waveform at IC801 pins 41 and 42
2Vpp 10MHz sine wave
NG
X801, IC801 failure
OK
Check Sync signals
Check the pulse 5Vpp at IC801 pin 4 (H sync), IC801 pin 36 (VD), IC801 pin 59 (H polarity) and IC801 pin 58 (V polarity) on the VIDEO PWB (PWE-567A).
NG
Sync interface circuit failure (see item 3)
OK
IC801 failure

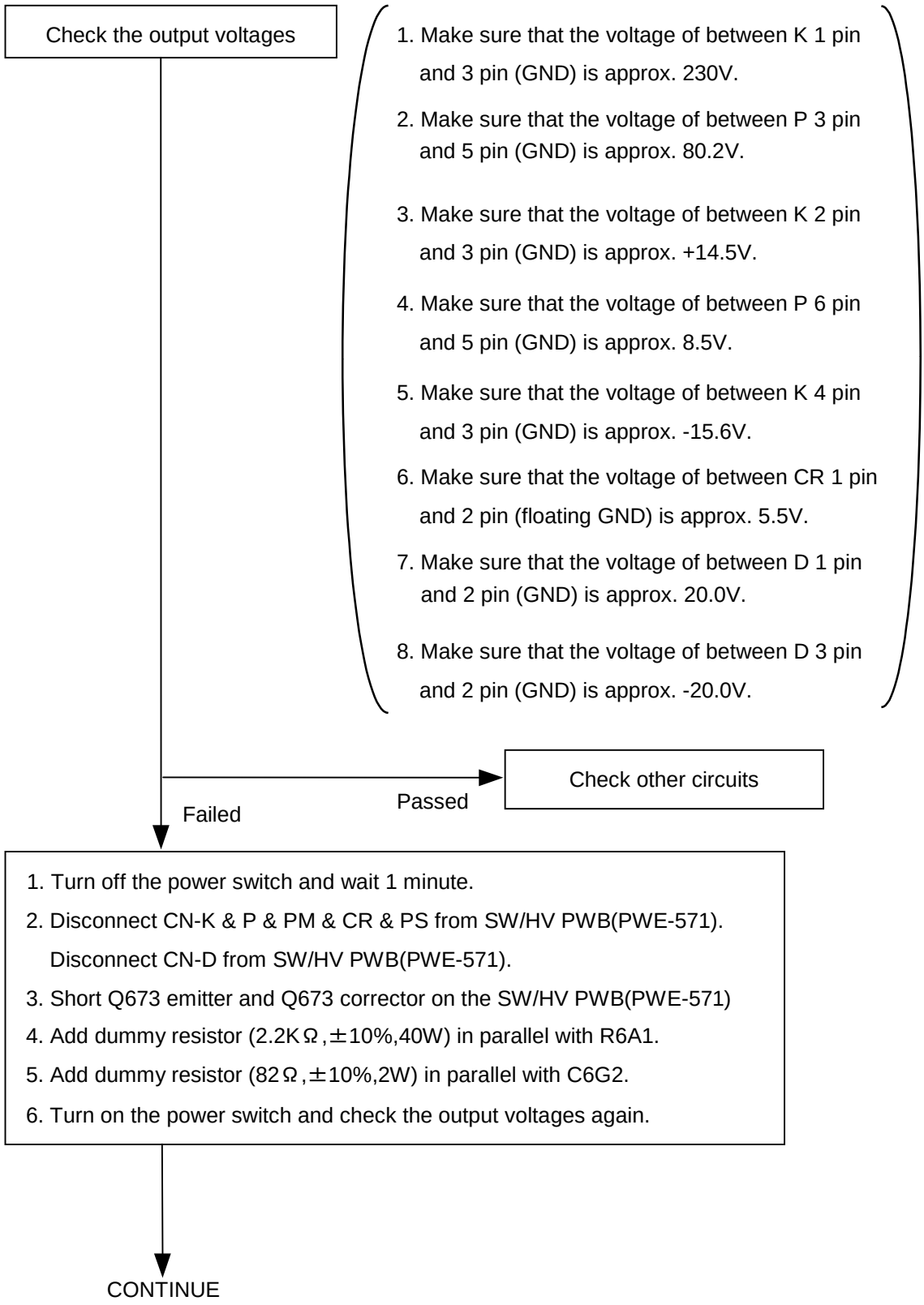
12-2. User control error

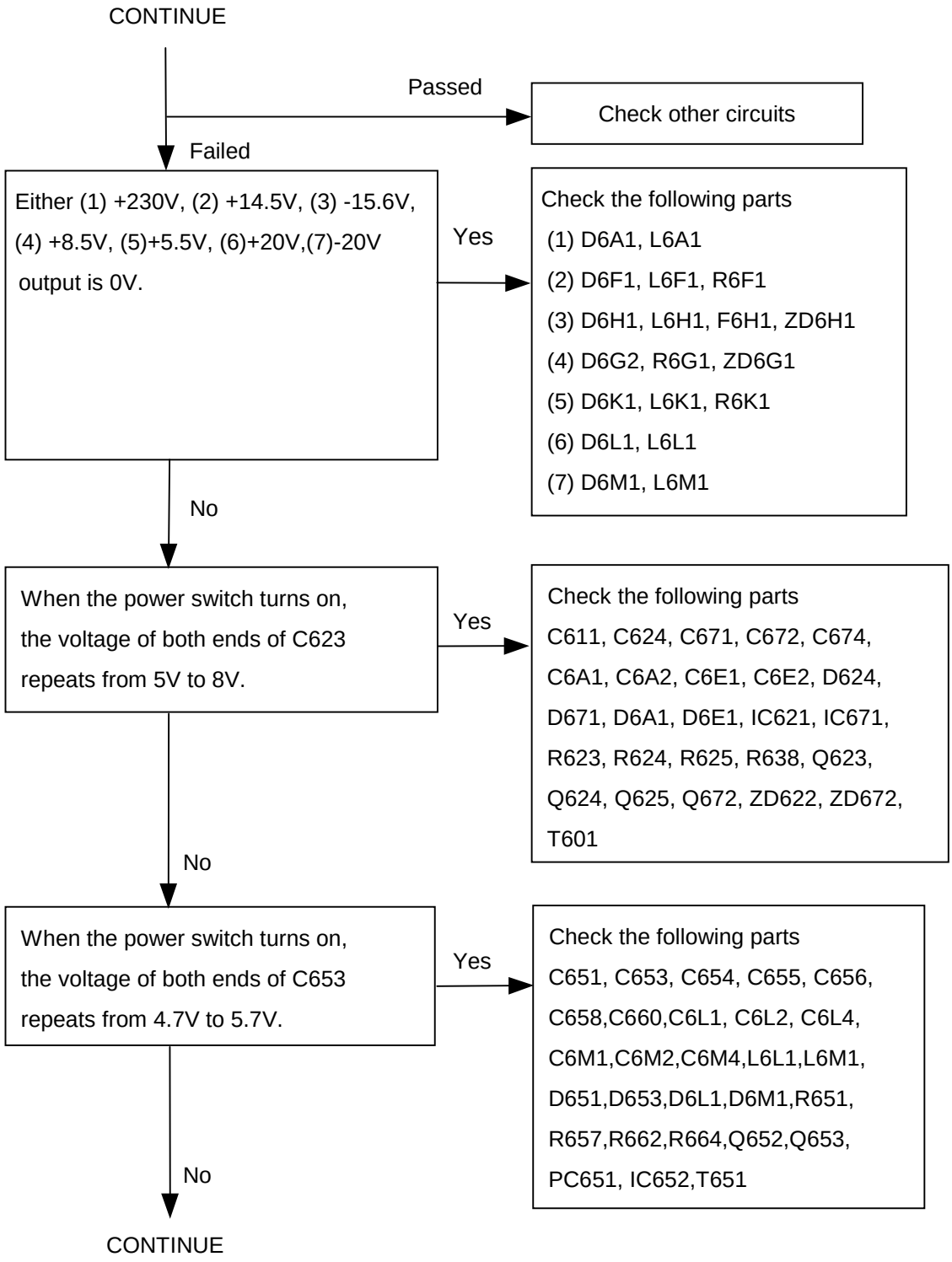

Check the control switches
Check the voltage at CN-CL pin 4 to 11 on the VIDEO PWB(PWE-567A), when push the user control switches.
NG
CONTROL PWB failure
OK
Digital control error

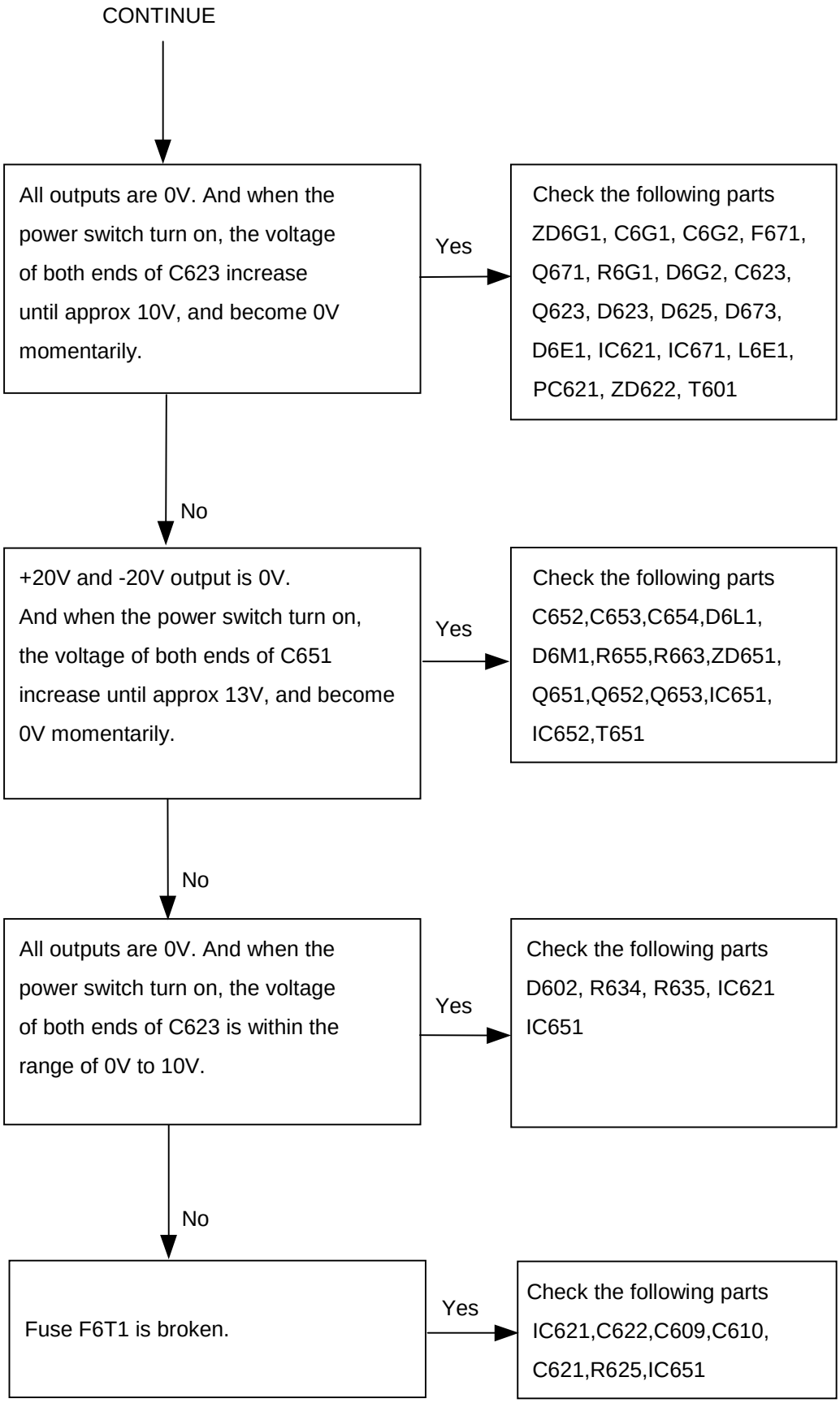
12-3. DAC output error


Check upper and lower ref. voltage
Check the voltage at each DAC upper and lower.
IC751 : Upper.....pin9,11, Lower.....pin 8
IC532 : Upper.....pin11,13, Lower.....pin10
NG
IC571 : V_{DD}.....pin13, GND.....pin8
Each DAC, IC802 and their ambient circuit failure
OK
Check serial communications (I^2C-Bus method)
Check some pulse are presented at IC801 pin 62 (SDA) pin 64 (SCL) on VIDEO PWB
Normally, these pulses can be seen.
No pulse
Digital control error
Pulse
Each DAC, IC802 and their ambient circuit failure

13. SWITCHING REGULATOR CIRCUIT FAILURE


Check the output voltages
1. Make sure that the voltage of between K 1 pin and 3 pin (GND) is approx. 230V.
2. Make sure that the voltage of between P 3 pin and 5 pin (GND) is approx. 80.2V.
3. Make sure that the voltage of between K 2 pin and 3 pin (GND) is approx. +14.5V.
4. Make sure that the voltage of between P 6 pin and 5 pin (GND) is approx. 8.5V.
5. Make sure that the voltage of between K 4 pin and 3 pin (GND) is approx. -15.6V.
6. Make sure that the voltage of between CR 1 pin and 2 pin (floating GND) is approx. 5.5V.
7. Make sure that the voltage of between D 1 pin and 2 pin (GND) is approx. 20.0V.
8. Make sure that the voltage of between D 3 pin and 2 pin (GND) is approx. -20.0V.
Passed
Check other circuits
Failed
1. Turn off the power switch and wait 1 minute.
2. Disconnect CN-K & P & PM & CR & PS from SW/HV PWB(PWE-571).
Disconnect CN-D from SW/HV PWB(PWE-571).
3. Short Q673 emitter and Q673 corrector on the SW/HV PWB(PWE-571)
4. Add dummy resistor (2.2KΩ,±10%,40W) in parallel with R6A1.
5. Add dummy resistor (82Ω,±10%,2W) in parallel with C6G2.
6. Turn on the power switch and check the output voltages again.
CONTINUE

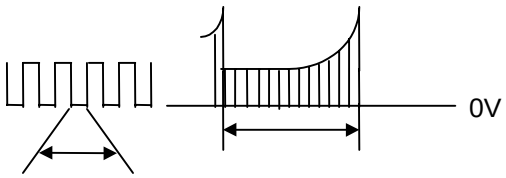

CONTINUE
Passed
Check other circuits
Failed
Either (1) +230V, (2) +14.5V, (3) -15.6V,
(4) +8.5V, (5)+5.5V, (6)+20V,(7)-20V
output is 0V.
Yes
Check the following parts
(1) D6A1, L6A1
(2) D6F1, L6F1, R6F1
(3) D6H1, L6H1, F6H1, ZD6H1
(4) D6G2, R6G1, ZD6G1
(5) D6K1, L6K1, R6K1
(6) D6L1, L6L1
(7) D6M1, L6M1
No
When the power switch turns on,
the voltage of both ends of C623
repeats from 5V to 8V.
Yes
Check the following parts
C611, C624, C671, C672, C674,
C6A1, C6A2, C6E1, C6E2, D624,
D671, D6A1, D6E1, IC621, IC671,
R623, R624, R625, R638, Q623,
Q624, Q625, Q672, ZD622, ZD672,
T601
No
When the power switch turns on,
the voltage of both ends of C653
repeats from 4.7V to 5.7V.
Yes
Check the following parts
C651, C653, C654, C655, C656,
C658,C660,C6L1, C6L2, C6L4,
C6M1,C6M2,C6M4,L6L1,L6M1,
D651,D653,D6L1,D6M1,R651,
R657,R662,R664,Q652,Q653,
PC651, IC652,T651
No
CONTINUE


CONTINUE
All outputs are 0V. And when the power switch turn on, the voltage of both ends of C623 increase until approx 10V, and become 0V momentarily.
Yes
Check the following parts ZD6G1, C6G1, C6G2, F671, Q671, R6G1, D6G2, C623, Q623, D623, D625, D673, D6E1, IC621, IC671, L6E1, PC621, ZD622, T601
No
+20V and -20V output is 0V. And when the power switch turn on, the voltage of both ends of C651 increase until approx 13V, and become 0V momentarily.
Yes
Check the following parts C652,C653,C654,D6L1, D6M1,R655,R663,ZD651, Q651,Q652,Q653,IC651, IC652,T651
No
All outputs are 0V. And when the power switch turn on, the voltage of both ends of C623 is within the range of 0V to 10V.
Yes
Check the following parts D602, R634, R635, IC621 IC651
No
Fuse F6T1 is broken.
Yes
Check the following parts IC621,C622,C609,C610, C621,R625,IC651

14. MOIRE CANCEL FAILURE

Operate the moire cancel control, and check the moire cancel control signal.

When the moire cancel control is max. condition, IC501 pin 22 waveform is as follows.



horizontal period vertical period

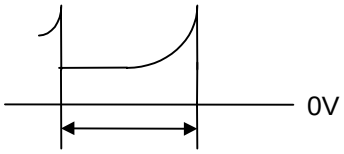
Only horizontal signal is NG.

- IC501 failure.
- Digital control circuit failure. (see item 12)

NG

Check the vertical moire cancel control signal.

When the moire cancel control is max. condition, C513 waveform is as follows.



vertical period

NG

- R512 or C513 failure.
- IC501 failure.
- Digital control circuit failure. (see item 12)

OK

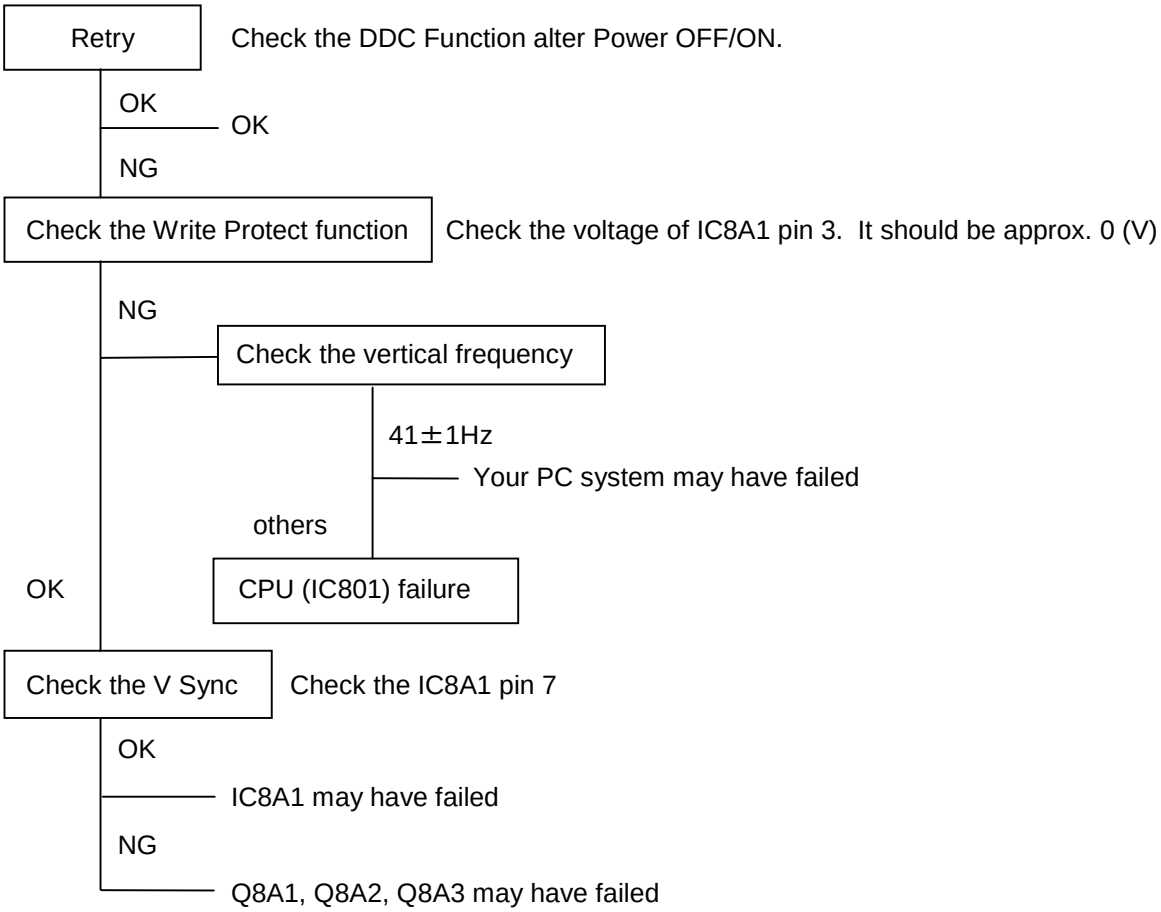
- R513 failure.
- IC501 failure.
- Digital control circuit failure. (see item 12)

OK

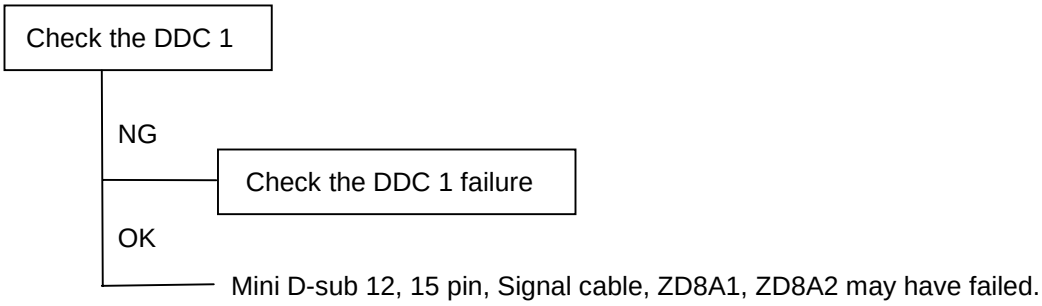
- C512, R511 or R508 failure.
- IC501 failure.

15. PLUG & PLAY FAILURE

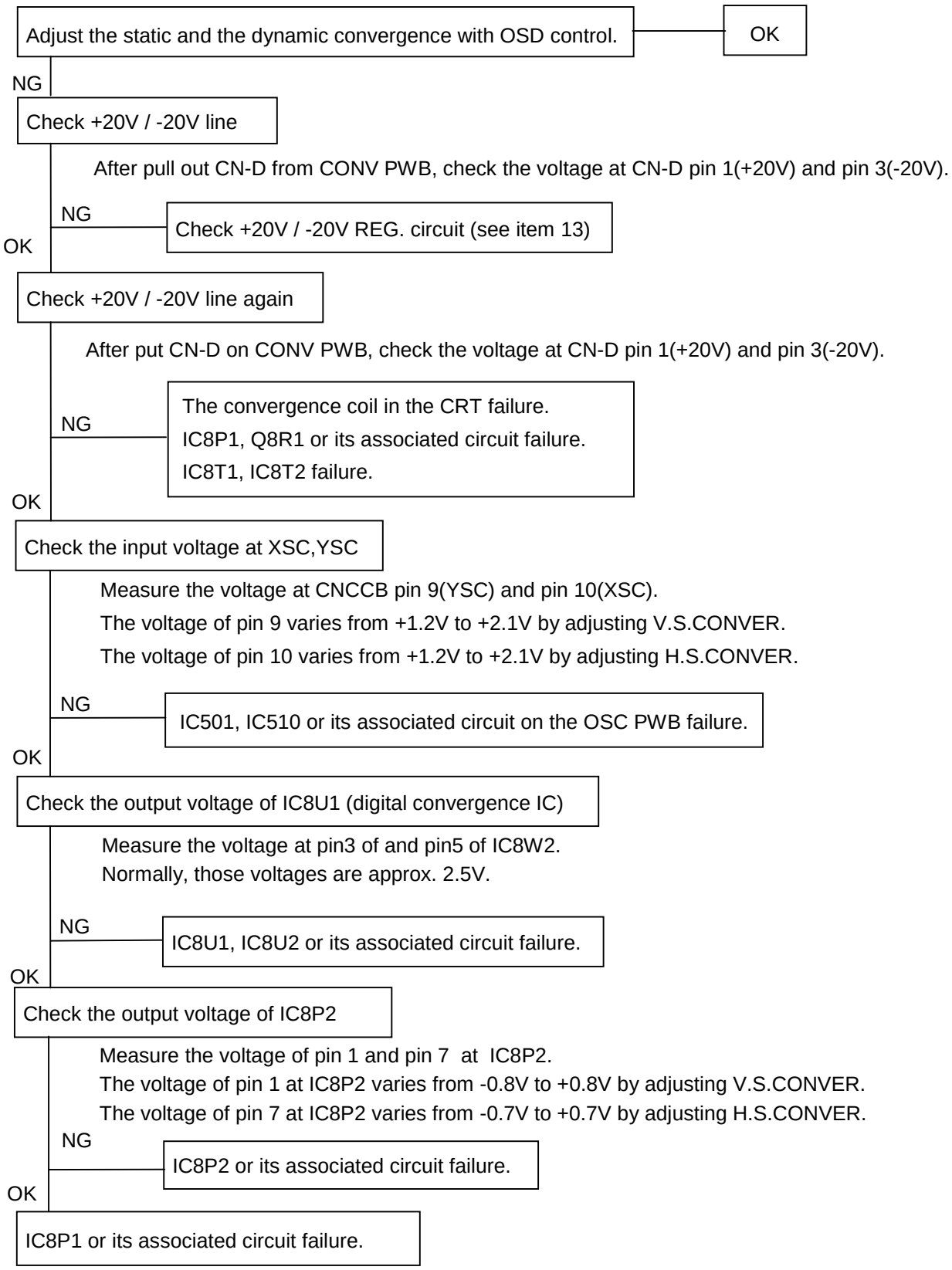
15-1. DDC 1 failure



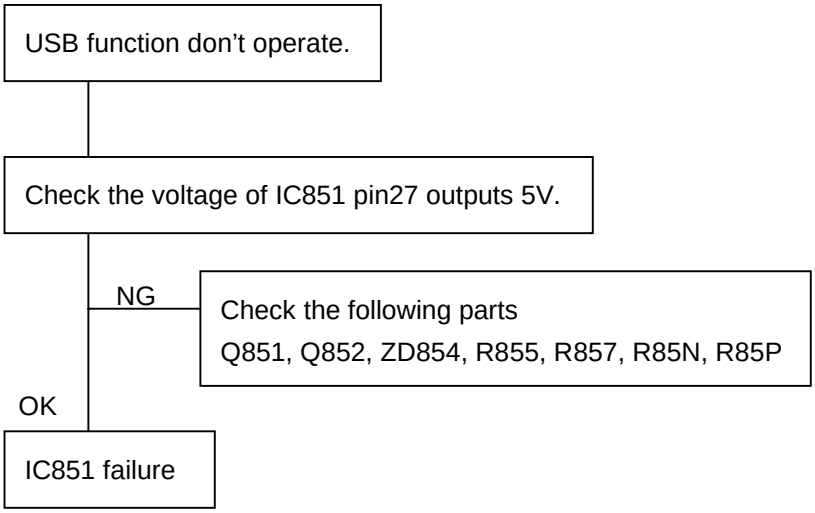
15-2. DDC 2B failure



16. OUT OF Cg-SPECIFICATION


Adjust the static and the dynamic convergence with OSD control.
OK
NG
Check +20V / -20V line
After pull out CN-D from CONV PWB, check the voltage at CN-D pin 1(+20V) and pin 3(-20V).
NG
Check +20V / -20V REG. circuit (see item 13)
OK
Check +20V / -20V line again
After put CN-D on CONV PWB, check the voltage at CN-D pin 1(+20V) and pin 3(-20V).
NG
The convergence coil in the CRT failure.
IC8P1, Q8R1 or its associated circuit failure.
IC8T1, IC8T2 failure.
OK
Check the input voltage at XSC,YSC
Measure the voltage at CNCCB pin 9(YSC) and pin 10(XSC).
The voltage of pin 9 varies from +1.2V to +2.1V by adjusting V.S.CONVER.
The voltage of pin 10 varies from +1.2V to +2.1V by adjusting H.S.CONVER.
NG
IC501, IC510 or its associated circuit on the OSC PWB failure.
OK
Check the output voltage of IC8U1 (digital convergence IC)
Measure the voltage at pin3 of and pin5 of IC8W2.
Normally, those voltages are approx. 2.5V.
NG
IC8U1, IC8U2 or its associated circuit failure.
OK
Check the output voltage of IC8P2
Measure the voltage of pin 1 and pin 7 at IC8P2.
The voltage of pin 1 at IC8P2 varies from -0.8V to +0.8V by adjusting V.S.CONVER.
The voltage of pin 7 at IC8P2 varies from -0.7V to +0.7V by adjusting H.S.CONVER.
NG
IC8P2 or its associated circuit failure.
OK
IC8P1 or its associated circuit failure.

17. USB CIRCUIT FAILURE



18. AUTO ADJUST CIRCUIT FAILURE

Set signal all white characters, and perform AUTO ADJUST on OSD control.

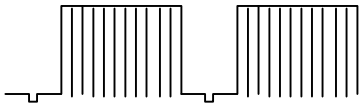
When check the following contents, perform AUTO ADJUST at the each time.

Check +5.0V and +3.3V — Make sure that the voltage of C8M7 is approx. +5.0V and C8MF is approx.+3.3V.

NG → +5.0V line, IC8M2 or IC8G2 failure on the VIDEO PWB.

OK

Check R.G.B video input signals — Check the waveform at IC8M1 pin 27,pin 28 and pin 29. (Approx. +3.2Vp-p)

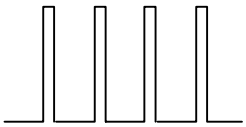


V. frequency

NG → Q8M1R, Q8M1G and Q8M1B failure separately or VIDEO CIRCUIT FAILURE. (See item 2)

OK

Check AFC_TTL input signal — Check the waveform at IC8M1 pin 14. (Approx.+5.0Vp-p)



H. frequency

NG → CNASD pin 4 or AFC_TTL line failure.

OK

Check V.PUMP input signal — Check the waveform at IC8M1 pin 13. (Approx. +5.0Vp-p)

V. frequency

NG → CNASD pin8 or V_PUMP line or its ambient circuit failure.

OK

Re-adjust Auto Adjust adjustment (Set again AUTO ADJUST L and AUTO ADJUST H)

NG → Failure IC8M1or it's ambient circuit failure.

OK

The video signal was not possible for working correctly of Auto Adjust function.

CIRCUIT DESCRIPTION

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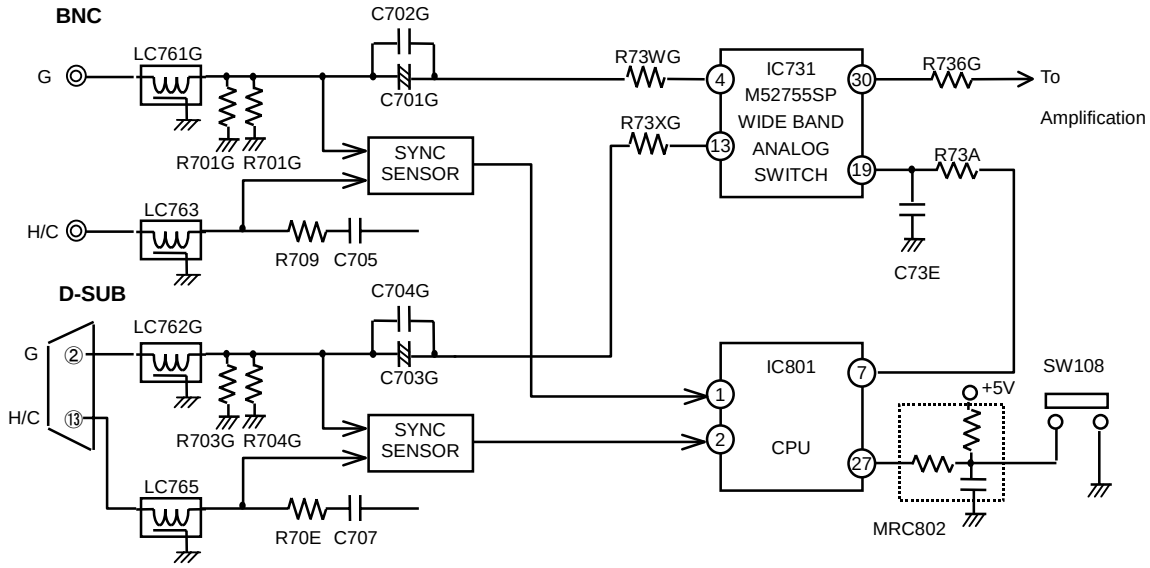
1. VIDEO CIRCIT

1) Selection of BNC/D-SUB Input

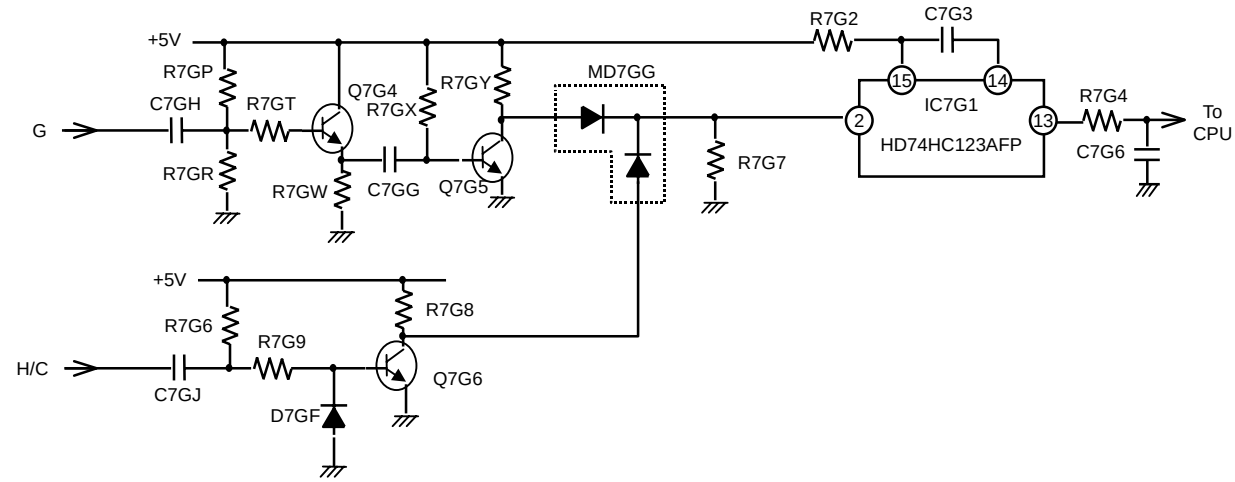
The input selection circuit selects the BNC input or D-SUB input according to the voltage of IC731 pin19 (0V or 5V). IC731 pin19 voltage changes whenever SW108 (momentary switch) is pressed.

CPU detects BNC input or D-SUB input by input signal of Sync On Green and H/C sync. JC-22W70's user can know by OSM information whether input is BNC or D-SUB. Sync sensor outputs high level when fH is 1kHz or more, and low level when fH is less than 1kHz.

CPU detects BNC/D-SUB inputs and memories CONTRAST, SHARPNESS and EDGELOCK condition at each input.



(Fig 1.1.1) Input Selection Circuit (Green channel)



(Fig 1.1.2) Sync Sensor (D-SUB part)

2) Video Signal Amplification Section

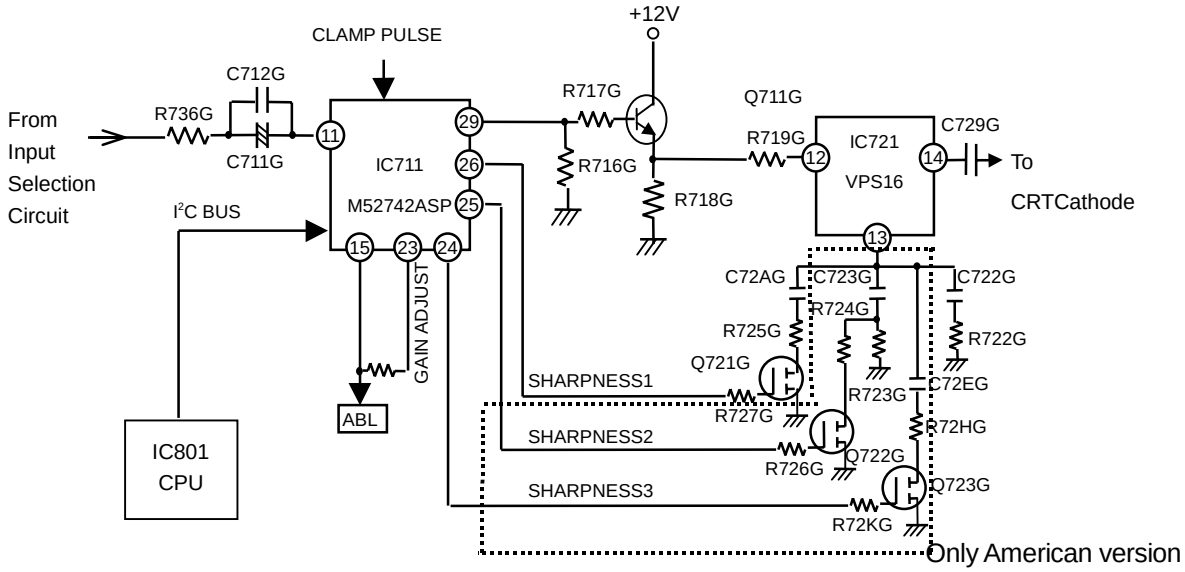
The video signal amplification section basically consists of the input section circuit and the amplification circuit. Each Red(R), Green(G) and Blue(B) video signal circuit is identical to each other, the G circuit being described below.

The video signal through the input selection circuit is input the amplification circuit. The amplification circuit is constructed with IC711(Pre-amp), Q711G(buffer), IC721(Output amp).

IC711 controls CONTRAST and R/G/B GAIN with I^2C BUS by CPU. Only ABL function is controlled by external DC voltage. IC711 is possible to change gain, it is approx.4.3 after the video adjustment.

The output of IC711 is buffered by Q711G and fed to IC721(Output amp).IC721's gain is fixed approx.15.

Rs and Cs connected IC721 pin 13 form emitter peaking. On American version, emitter peaking effect changes 4 levels by Q721G, Q722G and Q723G. On European version, that changes 2 levels by Q721G.



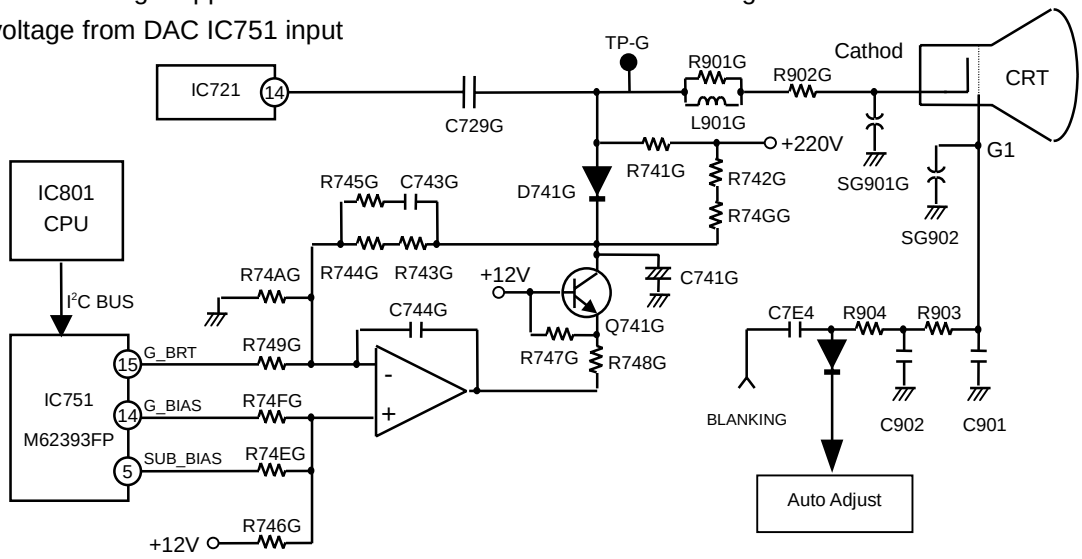
(Fig 1.2) Video Amplification Circuit

3) Video Bias Circuit

The video signal is amplified maximum 45Vpp in IC721 output, then the signal is done DC bias by video bias circuit through C729G. This DC voltage varies when cut off adjustment and brightness adjustment.

The video bias circuit consists of fixed voltage circuit construction with op-amp. Q741G is used high-voltage transistor due to get approx.80V to 170V at cathode black level voltage.

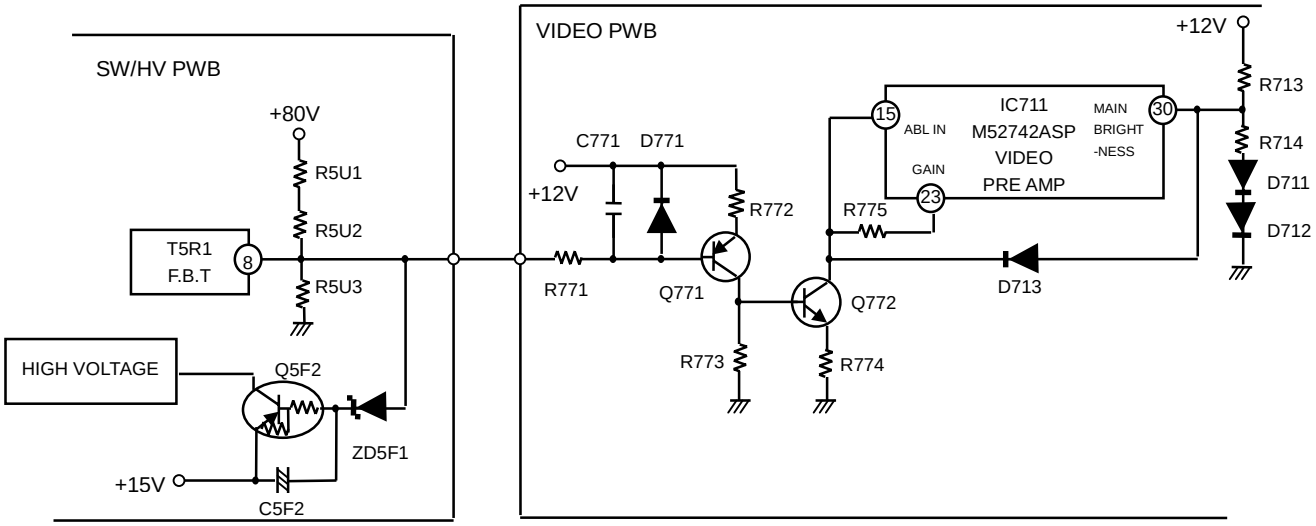
The voltage from DAC IC751 input



(Fig 1.3) Brightness and Cut-off Control

4) ABL Circuit

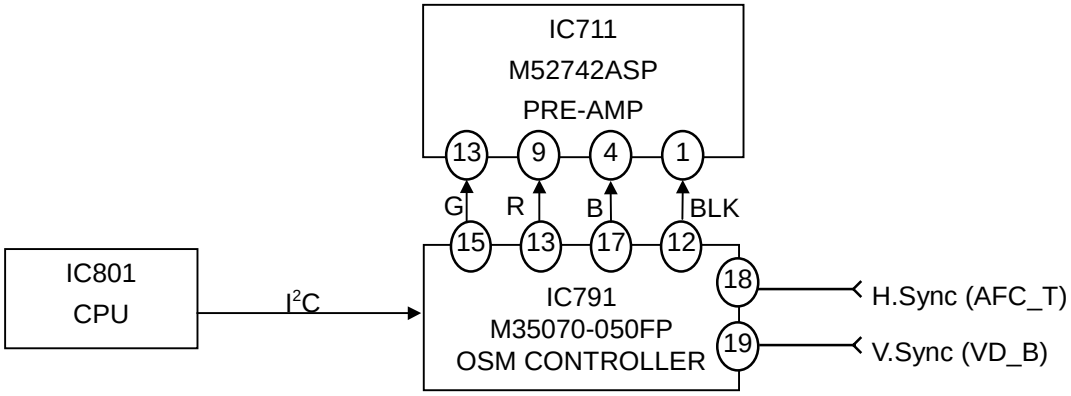
The ABL circuit consists of the part (Q771,Q772 and peripherals) which detects and amplifies the current flowing to the CRT anode, and the other parts (IC711) which control the gain of the video signal (R,G and B). The ABL circuit limits the amplitude of the video signal and serves to keep the maximum average current flowing to the CRT up to 750 μ A. When the anode current is less than 750 μ A, Q772 does not operate. And the anode current attempts to exceed 750 μ A, Q772 operates and the voltage of IC711 pin 15 drops, the gain of IC711 drops. After saturation of IC711 pin 15, D713 becomes ON, then IC711 pin 30 drops. This is the voltage that decides the black level of IC711 video output. Therefore back raster becomes dark.



(Fig 1.4) ABL Circuit

5) On Screen Manager (OSM)

The OSM circuit consists of IC791 (OSM controller) and IC711 (Pre-amp) which matrix the video signal and the OSM signal. IC791 receives the display data from IC801 (CPU), and the signal outputs R, G, B and Blanking are fed out of pins 13, 15, 17 and 12 respectively. The OSM signals are mixed with video signals in IC711 (Pre-amp). The OSM screen brightness is controlled by I^2C BUS from CPU.



(Fig 1.5) On Screen Manager

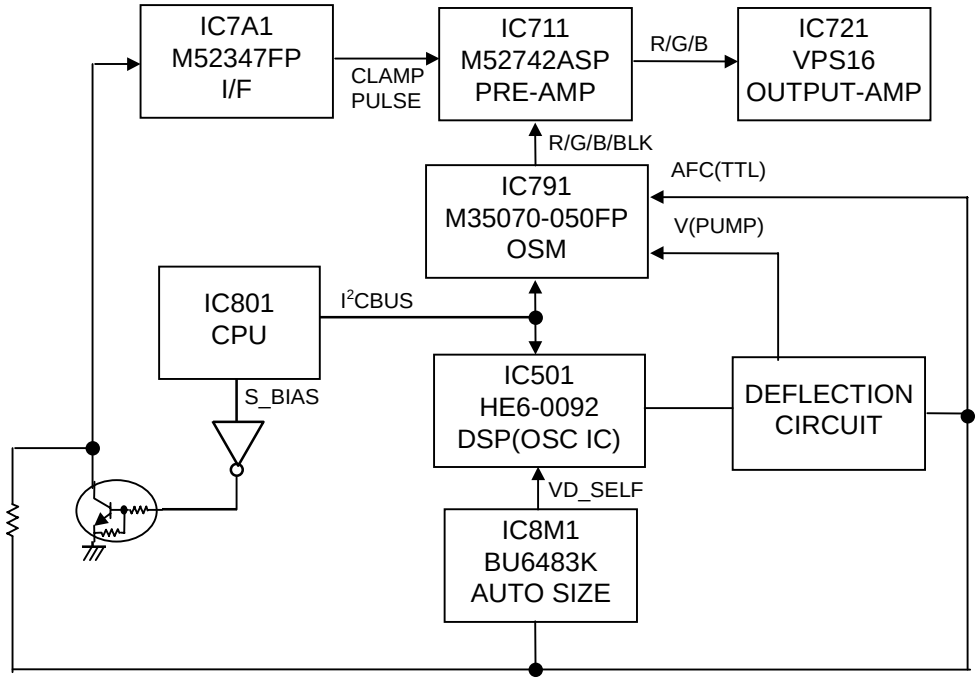
6) Self Test

There are two ways to activate the self test function,.

User mode: power on the monitor while holding down the RESET switch

Factory mode: no H/C sync and SOG of selected input mode

When the self test mode is activated, IC801(CPU) controls IC501 to oscillate at approx.61.6KHz. Thus the horizontal deflection circuit and the high voltage circuit operate at this frequency. When Q797 is turned off by S_BIAS signal from IC801(CPU). The pseudo vertical sync signal count down from the horizontal sync signal with IC8M1 is effective, and the shape AFC pulse are fed to IC791 and IC7A1, the clamp pulse for IC711 is generated by IC7A1. The video signal is generated by IC791, and fed to IC721(Output amp) via IC711(PRE-AMP).



(Fig1.6) Self Test

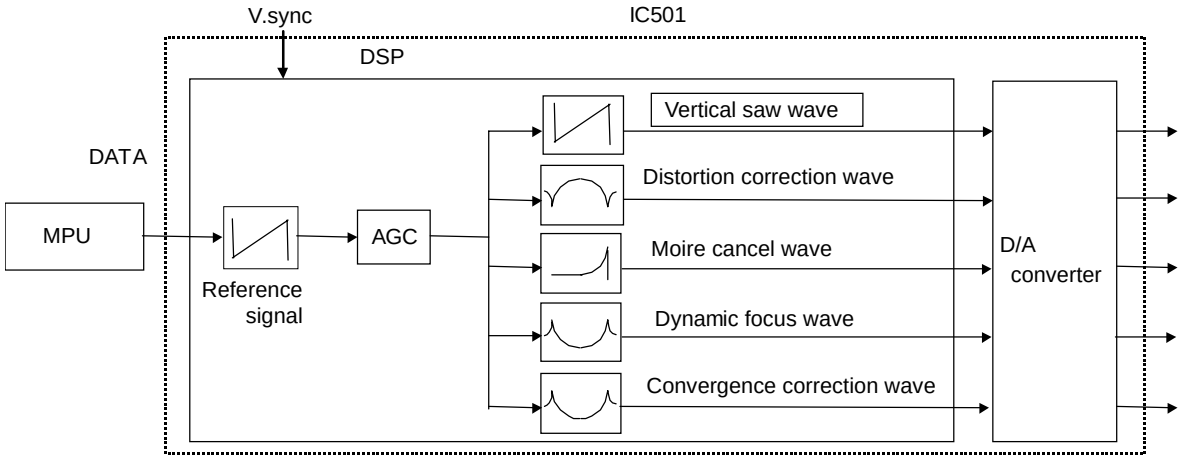
2. DEFLECTION CIRCUIT

2-1. The oscillation and deflection control integrated circuit

The oscillation and the deflection circuit is generated by IC501. IC501 has digital signal processor (DSP) and generates variety of correction signals by calculations. The feature of IC501 are low tolerance and low drift of temperature compared with current analog circuit. The functions of IC501 are Horizontal oscillation, Vertical oscillation, Horizontal position control, Distortion correction, Dynamic focus control, Moire canceler, and Convergence correction. These correction signals generated by DSP are converted to analog signal by the D/A converter, and these signals are output from IC output terminal.

1) Digital Signal Processor (DSP)

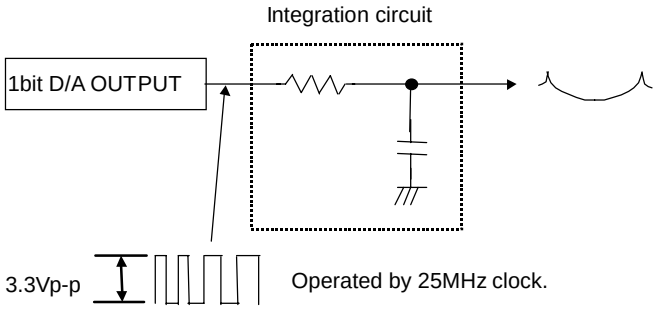
The digital signal processor generates variety of correction signals by calculations based on MPU (IC801) data. The DSP generate saw wave by MPU data. The signal, after the AGC in this saw wave, is moved to the reference signal. This reference signal generates various correction signals. All the signal wave shape formation inside DSP are done by the operation. The output signals from DSP are converted to analog signal by the D/A converter, and then these signals are output from IC output terminal.



(Fig. 2.1) Digital Signal Processor (DSP)

2) 1bit D/A converter (1bit DAC)

Most of the signals which are generated by DSP are output from 1 bit D/A converter. The 1bit D/A converter is pulse width modulation (PWM) circuit which is operated with 25MHz internal clock signal. The 3.3Vp-p signal which is modulated by pulse width is output from the 1bit D/A converter output terminal. This signal is integrated by integration circuit which is composed of resistor and capacitor and creates vertical periodic wave. The vertical dynamic focus control, distortion correction, convergence correction and moire canceler signals are output from the 1bit D/A converter.



(Fig. 2.2) 1bit D/A converter

2-2.HORIZONTAL DEFLECTION CIRCUIT

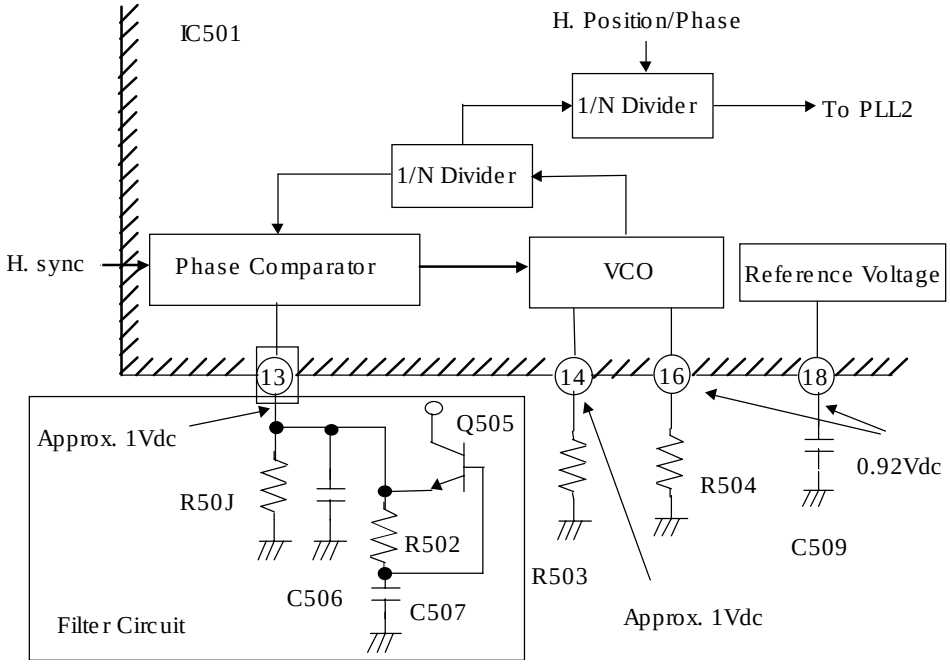
1) Horizontal oscillation circuit and Horizontal position control circuit

The horizontal oscillation circuit and the horizontal position control circuit are constructed by IC501. The horizontal oscillation circuit in IC501 is composed of two PLL (Phase Locked Loop) circuit (PLL1 circuit and PLL2 circuit).

①PLL1 circuit

MPU (IC801) measures the horizontal frequency of input signal and set the data to the frequency divider of PLL circuit (PLL1 and PLL2) in IC501. Then IC501 oscillates and controls horizontal position by PLL1 circuit based on MPU data.

The peripheral circuit of pin 13 is filter circuit and decides response characteristic of horizontal frequency. The voltage at pin 13 is approximately 1 volt DC. The resistors connected to pin 14 and pin 16 (R503 and R504) decide pull-in range of horizontal frequency. Pin 18 is reference voltage terminal of PLL (PLL1 and PLL) circuit and outputs 0.92 volt.

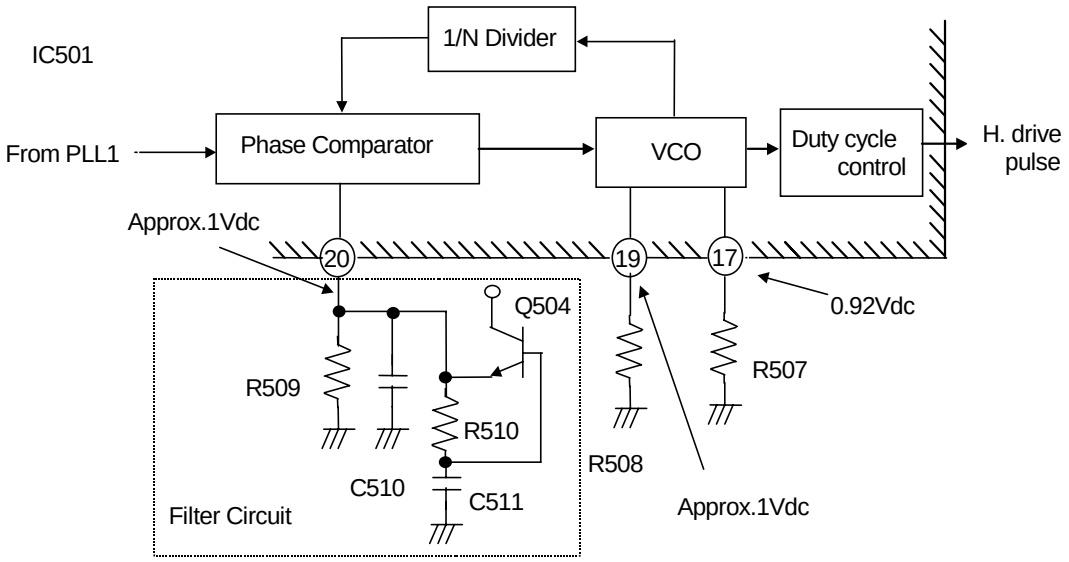


(Fig. 2.3) PLL1 circuit

②PLL2 circuit

The PLL2 circuit operates phase locking of fly-back pulse at IC501 pin 27 and duty cycle control of horizontal drive pulse at IC501 pin 25. The composition of PLL2 circuit is similar to PLL1 circuit. The peripheral circuit of pin 20 is filter circuit and decides response characteristic of horizontal frequency. The voltage at pin 20 is approximately 1 volt DC. The resistors connected to pin 17 and pin 19 (R507 and R508) of horizontal frequency.

IC501 operates phase locking by comparing internal PLL1 circuit output signal with fly-back pulse. The duty ratio of horizontal drive pulse at IC501 pin 25 is set to approximately 50% by MPU data and this duty ratio does not depend on horizontal frequency.



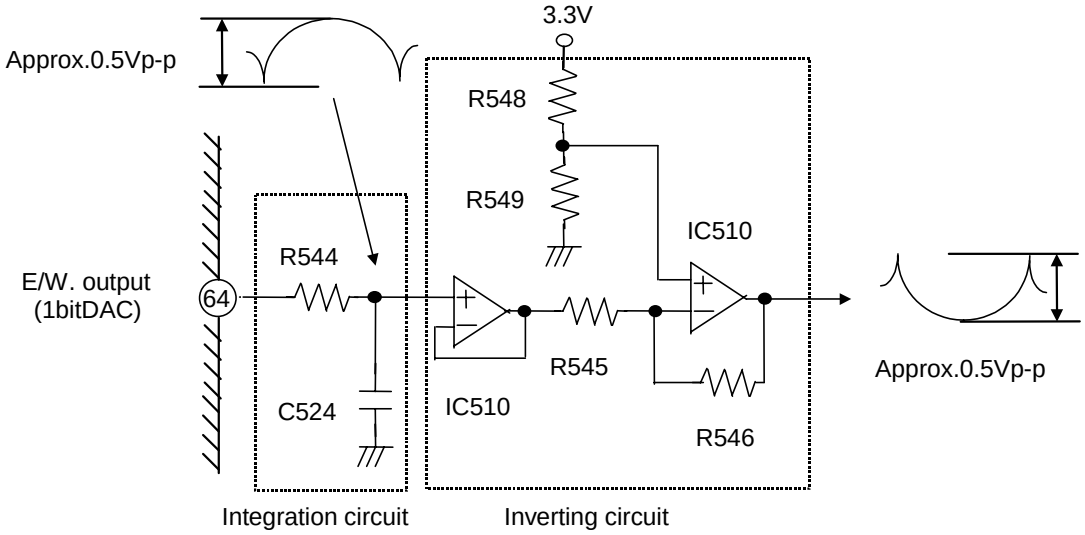
(Fig. 2.4) PLL2 circuit

2) Distortion correction circuit

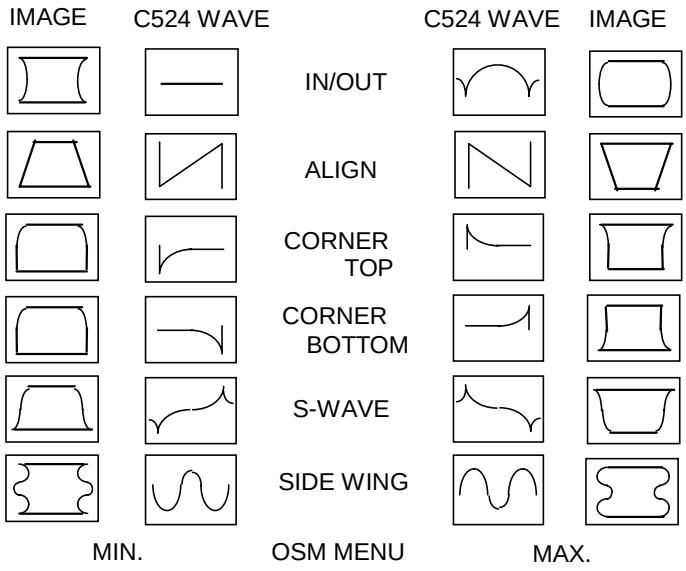
①Size distortion correction circuit

This model has 6 size distortion correction items. (SIDE PIN, ALIGN, CORNER TOP, CORNER BOTTOM, S-WAVE, SIDE WING). MPU controls these distortion correction data of IC501. DSP in IC501 generates these correction signals and outputs distortion correction signal which is combined each of the correction signals. The distortion correction signal is output from 1bit D/A converter at pin 64, and is integrated by integration circuit which is composed of R544 and C524. This integrated signal is inverted by IC510, and IC510 output signal is input into the distortion correction output circuit.

The figure 2.6. shows the screen image and voltage waveform at C524, when the size distortion correction are operated by OSM.



(Fig. 2.5) size distortion correction signal output

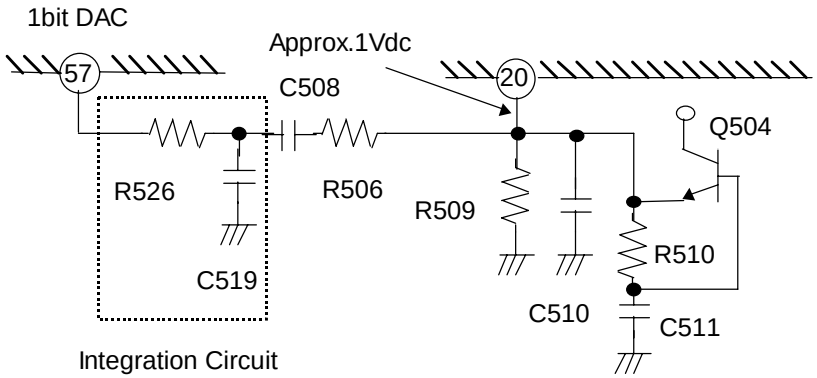


(Fig. 2.6) Voltage at C524 and screen image

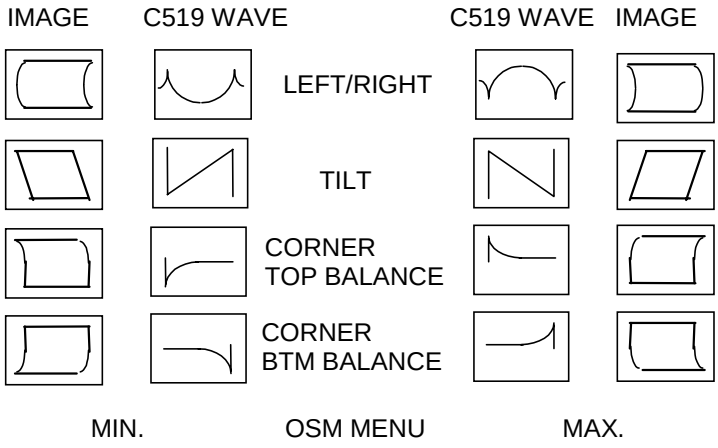
②Phase distortion correction circuit

This model has 4 phase distortion correction items. (SIDE PIN BALANCE, TILT, CORNER TOP BALANCE, CORNER BOTTOM BALANCE). The distortion correction signal is output from 1bit D/A converter at pin 57, and is integrated by integration circuit which is composed of R525 and C519. This integrated signal is added to filter terminal at pin 20 (PLL2 filter circuit) via C508 and R505.

The figure 2.8. shows the screen image and voltage waveform at C519, when the phase distortion correction are operated by OSM.



(Fig. 2.7) phase distortion correction circuit



(Fig.2.8) Voltage at C519 and screen image

3) Horizontal Drive Circuit

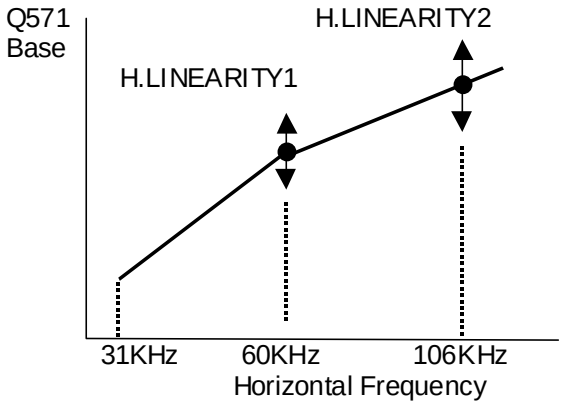
The horizontal drive system uses what is generally referred to as a flyback system.
The horizontal drive pulse output from IC501 pin 25 switches Q555 on and off.
It is amplified by T551 and switches Q561 (the horizontal output transistor) on and off.
The voltage of C552 for horizontal drive is fixed at 15V.

4) Horizontal Deflection Output Circuit

It corrects the optimum horizontal linearity by using Linear-coil and S correction capacitor to change the horizontal frequency mode. Horizontal frequency mode is shown in CPU CIRCUIT description section. The Inductance of Linear-coil (T571) varies with horizontal frequency.

①Variable Linearity Coil (T571)

Horizontal circuit has variable linearity coil (T571) and control the character to optimum in all resolution. The value of T571 is changed by current of control coil and ambient circuit. The current goes down at the lower frequency and goes up at the higher frequency due to change the base voltage of Q571. Base voltage is adjusted to optimum by H.LINEARITY1 and H.LINEARITY2 as following.



②S-Correction Circuit

IC571 (I/O Expander) make the matrix of FH band, and it switches a FET array (MQ571).

*Matrix of FH band (Refer to Fig. 6-1)

5) Horizontal Size Control Circuit

Horizontal size is controlled by power-supply voltage for a horizontal deflection made using PWM method. The horizontal size is controlled by two methods. One is H-SIZE which can be adjusted with a user menu, and the other is H-SIZE MAX which can be adjusted only with a service menu. The horizontal size control circuit consists of the circuit shown in the following.

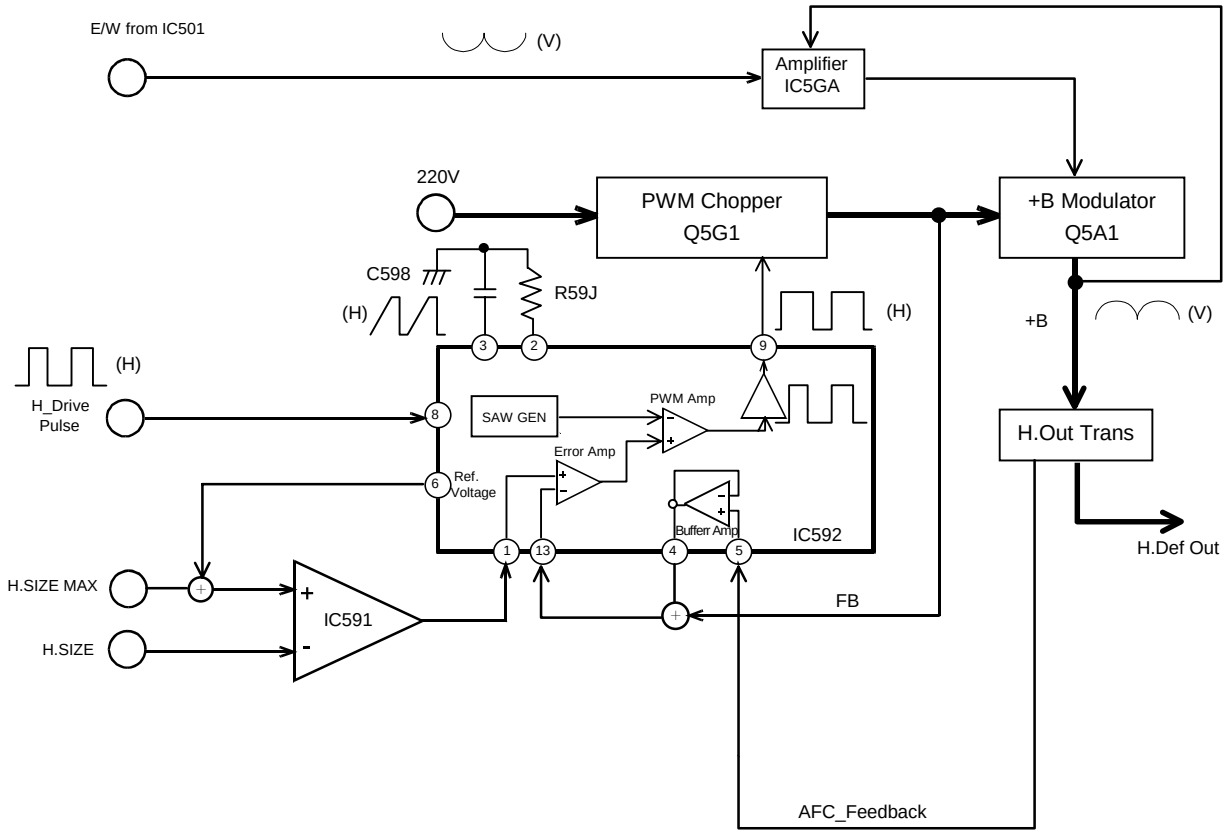
- Saw-tooth-wave form generator
- Switching pulse generator
- PWM Chopper
- +B modulation circuit

A saw-tooth wave form is generated inside IC592 . Its frequency is depend on horizontal drive pulse signal input at pin 8 and its slope is decided by the time constant of R59J and C598. The waveform can be monitored at pin 3.

Horizontal size control voltage is compared with reference voltage from pin 6 of IC592, output is fed into pin1 of IC592. On the other hand, horizontal maximum size control voltage is compared with AFC feedback voltage and then output is fed to a buffer circuit inside IC592 at pin5 and output at pin4 of IC592.

These 2 comparing voltages that are inputted at pin 1 and 13 shall be compared within IC592 as well as feedback from output voltage of PWM chopper circuit. Output of comparison is the voltage that controls the duty cycle of square wave that generated from saw-tooth waveform. Square wave is buffered and output at pin 9 of IC592 to the gate of Q5G1,PWM modulation.

Source voltage (230V) of Q5G1 is converted into horizontal deflection voltage by the duty cycle of the square wave. This voltage is supplied to a horizontal size modulation circuit consists of Q5A1, R5AC, R5AE, C5A5, C5A8, and ZD5A1. Transistor Q5A1 modulates chopper DC output voltage from L5G2, C5G3. Self bias voltage by R5AC and R5AE , and a modulation wave form(E/W parabolic wave form) is applied to a base through C5A6. A modulation wave form is made in the distortion correction circuit described in below section



(Fig. 2.9) HORIZONTAL SIZE CONTROL CIRCUIT

①Horizontal size modulation circuit

The transistor Q5A1modulates the Chopper output voltage that location is C5G3. This transistor is biased by R5AC and R5AE and the modulation wave is added to the base through C5A6. The modulation wave is made by Horizontal size correction circuit which is described section 2).

②User H SIZE control

OSM control for users vary from 0 to 255. At this time, the voltage of IC532 pin 5 (HS control line) vary from 5V to 0.9V.

The horizontal video size reduces as much as approximately 78% irrespective of the horizontal frequency when the maximum size is taken to 100%.

③H SIZE MAX control

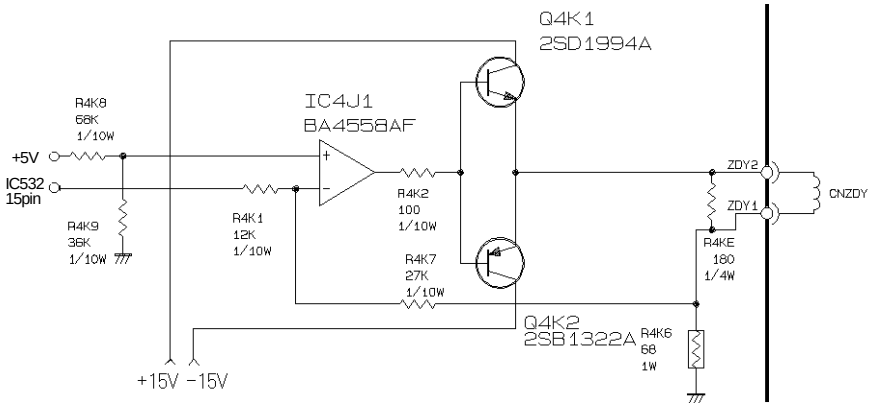
The H SIZE MAX control is accessible in service mode only, and this control sets the maximum horizontal size. The H SIZE for user control vary from the horizontal maximum size which is adjusted at this stage to less than the H SIZE MAX. H SIZE MAX control vary from 0 to 255 on OSM menu, and the voltage of IC532 pin 6 output voltage vary from approximately 0.9V to 5V. The horizontal maximum size control voltage (HSM)is output to IC591 pin 10 and is compared to the HS voltage (IC591 pin 9) . The HSM output voltage is converted to slice voltage at the comparator for PWM control which is input to error amplifier IC592 pin 1.

The H SIZE MAX has two area of memory (H SIZE MAX 1 and 2) which is selected by the below table.

H Frequency Range[kHz]	Selected Memory
121.0 – 130.0	H SIZE MAX 2
111.0 – 121.0	H SIZE MAX 2
101.0 - 111.0	H SIZE MAX 2
82.6 - 101.0	H SIZE MAX 2
69.5 - 82.6	H SIZE MAX 2
52.7 - 69.5	H SIZE MAX 2
49.0 - 52.7	H SIZE MAX 1
41.5 - 49.0	H SIZE MAX 1
36.6 - 41.5	H SIZE MAX 1
33.6 - 36.6	H SIZE MAX 1
30.8 - 33.6	H SIZE MAX 2

6) Rotation Correction Circuit

Raster rotation is corrected by moving the electron beam in the magnetic field produced by current applied to the Z-coil. The amount of correction is proportional to the current applied to the Z-coil and the correction can be adjusted with the control voltage (DC) of the D/A converter. The DC voltage output from IC532(D/A converter) pin 15 generates current to flow in the Z coil, and amount of rotation is determined. User can adjust the level of rotation by operating OSM menu (Rotate). The level of rotation is controlled by detective amplifier (IC4J1), and output the current to Z coil by push-pull buffer. (Q4K1, Q4K2)



(Fig. 2.10) Rotation Correction Circuit

7) H Centering Circuit

Switching regulator generates the floating 5.5 volts which is compared to the deflection circuit power supply voltage (high B+ voltage). This voltage is divided by VR581 (H centering) and is supplied to the base of Q581. The voltage differences of Q581's base and emitters is supplied to L562.

Horizontal centering is manipulated by the current supplied by L562 to the horizontal deflection circuit.

2-3. VERTICAL DEFRECTION CIRCUIT

The vertical deflection circuit is constructed by following three blocks.

1) Sawtooth wave generating, vertical size and position control and linearity control circuits
2) Vertical filter circuit
3) Vertical output amplifier circuit

1) Sawtooth wave generating, vertical size and position control and linearity control circuits

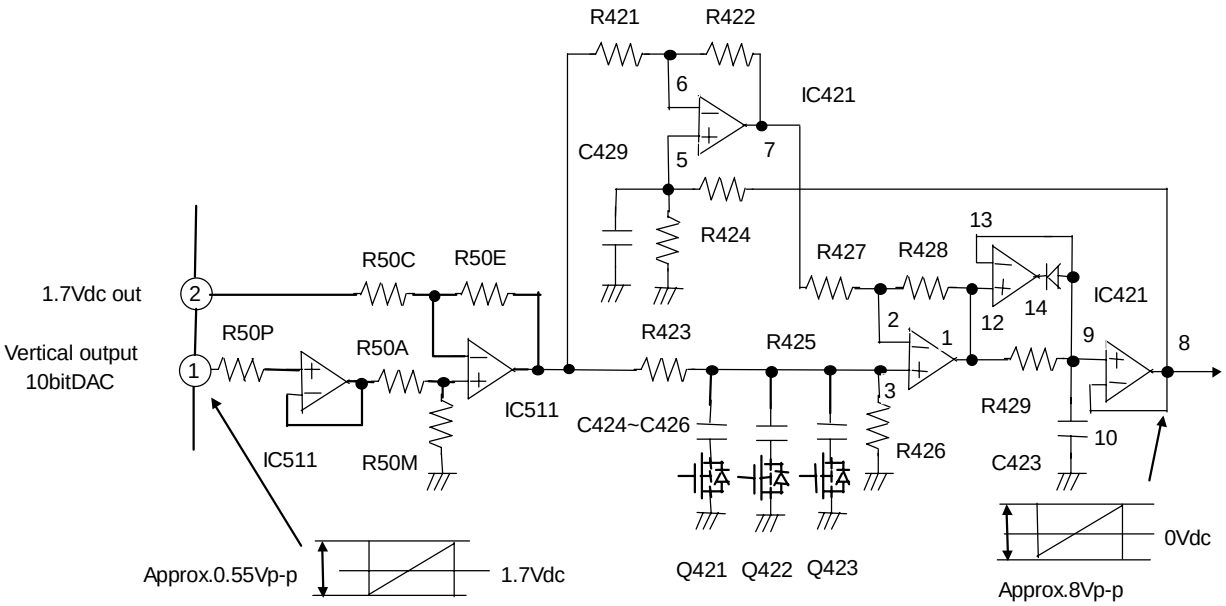
The vertical sync signal from IC7A1 on VIDEO PWB is fed to IC501 pin 42 on OSC PWB. DSP in IC501 generates saw wave by calculations. The signal, after the AGC in this saw wave, is moved to vertical deflection control signal. This vertical deflection control signal is output from IC501 pin 1. After IC501 receives vertical size data, vertical position data, vertical max. size data, vertical raster position data, vertical linearity data and vertical linearity balance data from MPU, IC501 pin 1 outputs vertical saw wave which is controlled by these correction items.

The vertical max. size control is standard adjustment item for vertical size. The vertical raster position control is standard adjustment item for vertical position. These control items do not have the function of tracking operation for distortion correction.

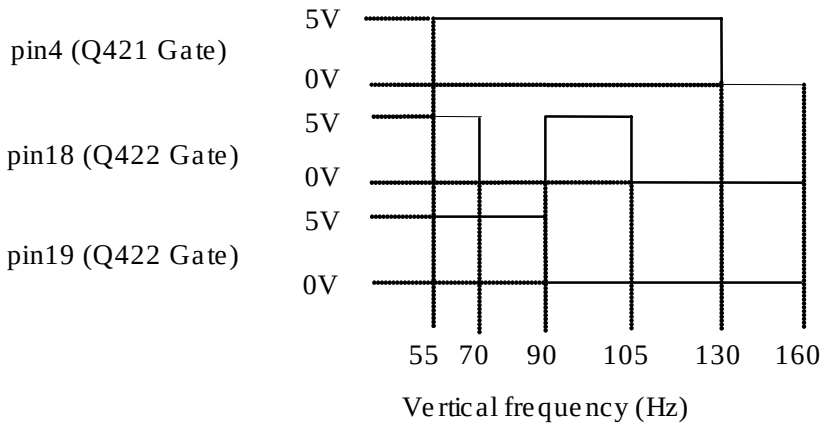
2) Vertical filter circuit

IC501 pin 1 output of vertical saw wave is converted 1.7V DC to 0V DC and amplified 14.5 times by IC511. The output signal of IC501 includes digital noise because it is generated by digital circuit. After this digital noise is eliminated by filter circuit which are composed of IC421 and its peripheral circuit, the vertical saw wave is sent to the vertical output amplifier circuit.

The vertical saw wave is input to IC421 pin 3. After this vertical saw wave is combined with output signal at IC421 pin 7, this combined signal passes the low pass filter composed of R529 and C423. The low pass filter eliminates the digital noise and the vertical saw wave output from IC421 pin 8. Q421, Q422 and Q423 are correction circuit for vertical linearity. These FET are controlled by IC532 based on vertical frequency. Figure 2.12 shows IC532 output voltage.



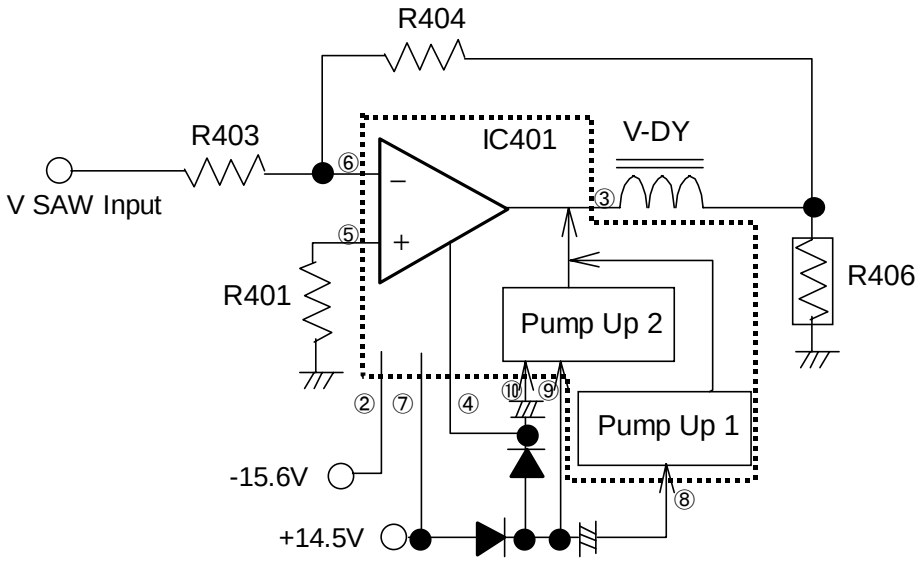
(Fig. 2.11) vertical saw wave output and filter circuits



(Fig. 2.12) IC532 output voltage

3) Vertical output amplifier circuit

The current proportional to the input voltage to IC401 is supplied to the vertical deflection coil (V-DY). The vertical deflection current is taken as voltage wave form on R406 and fed back to IC401.



(Fig. 2.13) Vertical output amplifier circuit

3. HIGH VOLTAGE CIRCUIT

The high voltage circuit consists of the high voltage control circuit, and Q5R1 and its peripheral circuits made up for the high voltage output circuit and the high voltage protection circuit for instance of high voltages circuit irregular operation.

1) High Voltage Control Circuit

HVCT PWB assy is high voltage control circuit. It is located on the SW-HV connected board type connector. The high voltage detection voltage is output to TP-HV from the FBT's internal bleeder resistor.

The AFC pulse output from the horizontal output transformer (T561) is input to 14pin of IC5W1, and the sawtooth wave is generated in IC5W1. R5W6, C5W6 are parts to adjust a slope of sawtooth. This sawtooth wave is compared with the high voltage detection voltage and the drive pulse applied to the gate of Q5R1 is generated. This pulse width becomes narrower when the high voltage rises, and becomes wider when high voltage drops.

2) High Voltage Output Circuit

The output circuit operates depending on the drive pulse applied to the gate of Q5R1, and the fly-back pulse is produced at pin 1 of T5R1 (FBT). The drive pulse width changes with respect to the high voltage fluctuation resulting from changes in the CRT beam current and operation frequency, the peak value of the corrector pulse changes, and high voltage stabilization is performed.

3) High Voltage Protector Circuit

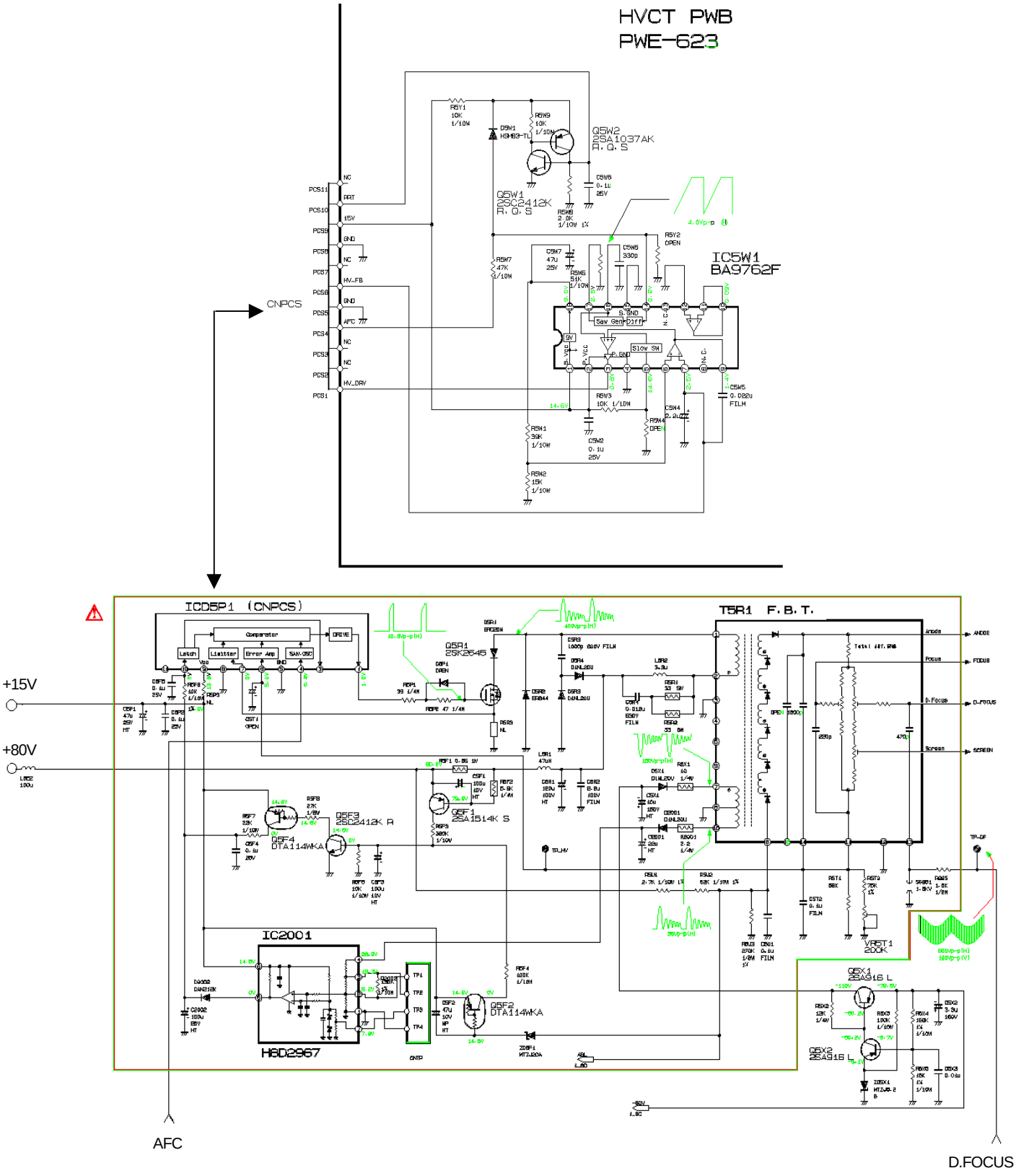
This circuit consists of the X-ray protector which stops the operation of the control circuit when the high voltage rises abnormally, and the overcurrent protector which operates when the current flowing into FBT (T5R1) has increased. Once the X-ray protector and the over current protector have started operation, their operation is not canceled unless the power supply is switched off, and then on again.

*X-ray protector

When the high voltage rises, the voltage of T5R1 (FBT) pin 10 rises. This voltage is compared with the reference voltage in IC2001, and when the reference voltage is exceeded, the comparator operates and output voltage of IC2001 (5pin) is high level, then the operation of the high voltage control circuit is stopped.

*Overcurrent Protector

When the current flowing into T5R1 (FBT) pin 2 increases, Q5F1 operates and Q5F3 is switched on.
Also when the current flowing into T5R1 (FBT) pin 8 increases, Q5F2 operates and Q5F3 is switched on.
When Q5F3 is switched on, Q5F4 is switched on and the voltage of ICD5P1 10pin rises.
Then latch circuit of Q5W1, Q5W2, and ambient parts operates and the high voltage control circuit is stopped.



(Fig.3.1) HIGH VOLTAGE CIRCUIT AND PROTECTOR CIRCUIT

4. BLANKING CIRCUIT

The blanking circuit consists of Q7E1 through Q7E3 which amplify the blanking pulse, the spot killer circuit and the auto adjust blanking circuit.

1) Blanking Circuit

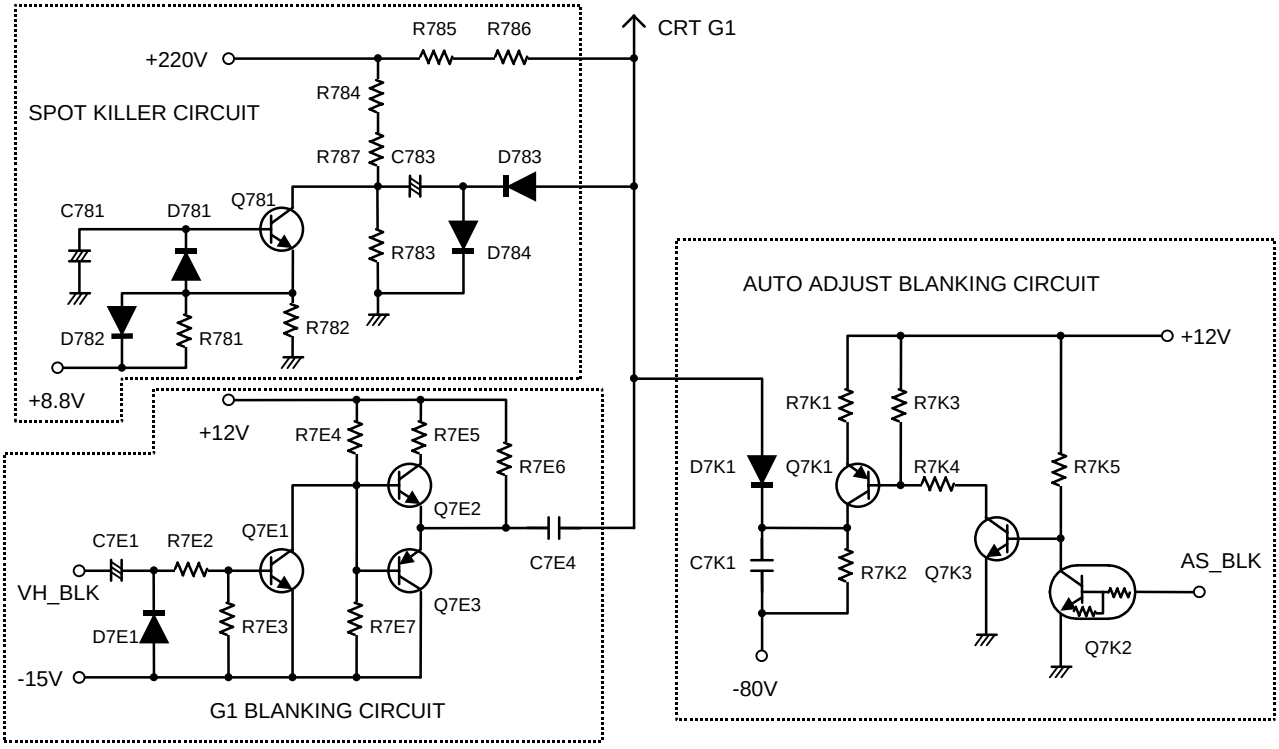
The IC501(DSP) on OSC PWB generates the blanking pulse which are mixed the horizontal blanking pulse and the vertical blanking pulse and outputs the blanking pulse(VH_BLK) from pin40.The blanking pulse is amplified by Q7E1 through Q7E3 and are applied to G1.Therefore during the horizontal and vertical retrace periods, the voltage of G1 becomes low and then the raster is disappeared.

2) Spot Killer Circuit

The spot killer circuit operates when the display is turned off ,the suspend and the off modes. When the power is on, Q781 is turned off by 8.8V of C781 and the collector voltage of Q781 becomes 137V. When the display is turn off, the Q781 is activated by the voltage of 8.8V power supply drop. Then the collector voltage of Q781 becomes 0V from 137V.Therefore G1 voltage is changed to -137V by the change of C783 charge. It is the same with the suspend and the off modes. Then the raster is cut off.

3) Auto Adjust Blanking Circuit

The auto adjust blanking circuit operates one second when the user proceeds the auto adjust on OSM. Then Q7K2 is activated by the change of the AS_BLK voltage. Then Q7K3 and Q7K1 are turned off. Therefore G1 voltage is change to -80V and the raster is cut off.



(Fig.4.1) Blanking Circuit

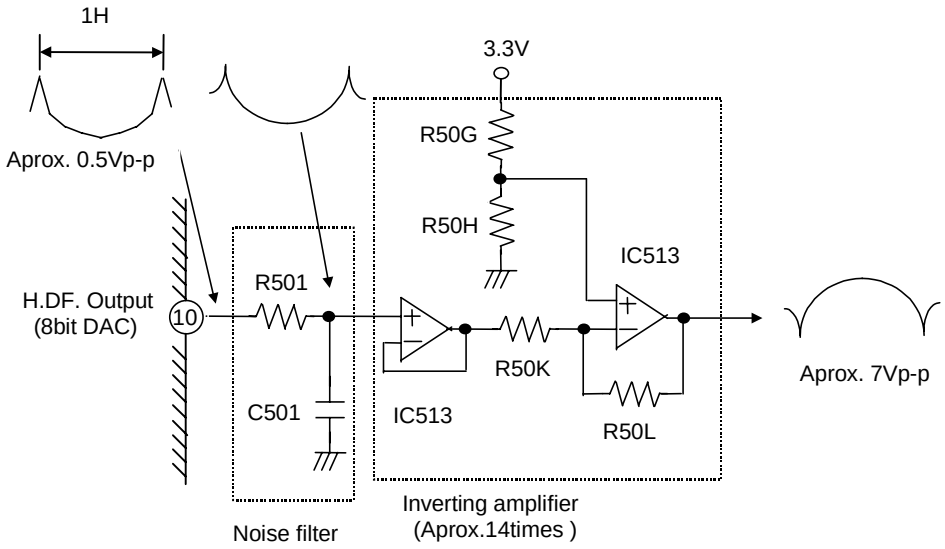
5. DYNAMIC FOCUS CIRCUIT

The dynamic focus circuit section is made up of following three blocks:

1) The horizontal parabolic wave generation and gain control circuit
2) The vertical parabolic wave generation and gain control circuit
3) The output amplifier circuit and the coupling circuit

1) The horizontal parabolic wave generation and gain control circuit

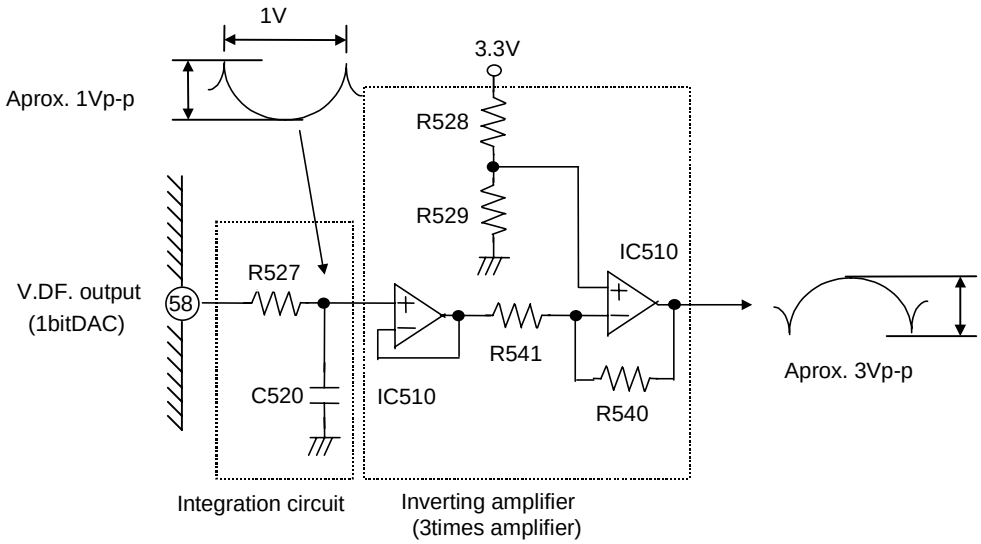
IC501 generates horizontal dynamic focus signal controlled by MPU data based on horizontal frequency and horizontal screen size. The horizontal dynamic focus signal which is generated by internal logic circuit is multiplied with vertical period signal which is created by DSP. The multiplier inside IC501 outputs the horizontal dynamic focus signal modulated with the vertical signal. This signal is output from 8bit D/A converter at pin 10 after it is converted to analog signal. The output signal at pin 10 is smoothed by noise filter composed of R501 and C501. After this signal is inverted and amplified approximately 14 times by IC513, it is sent to the horizontal dynamic focus output circuit.



(Fig. 5.1) The horizontal parabolic wave generation and gain control circuit

2) The vertical parabolic wave generation and gain control circuit

The vertical parabolic wave is generated by DSP. IC501 generates vertical parabolic wave by calculation based on MPU data and outputs vertical dynamic focus correction signal at IC501 pin 58. This signal is integrated by integration circuit composed of R527 and C520. After this signal is inverted and amplified approximately 3 times by IC510, it is sent to the vertical dynamic focus output circuit.

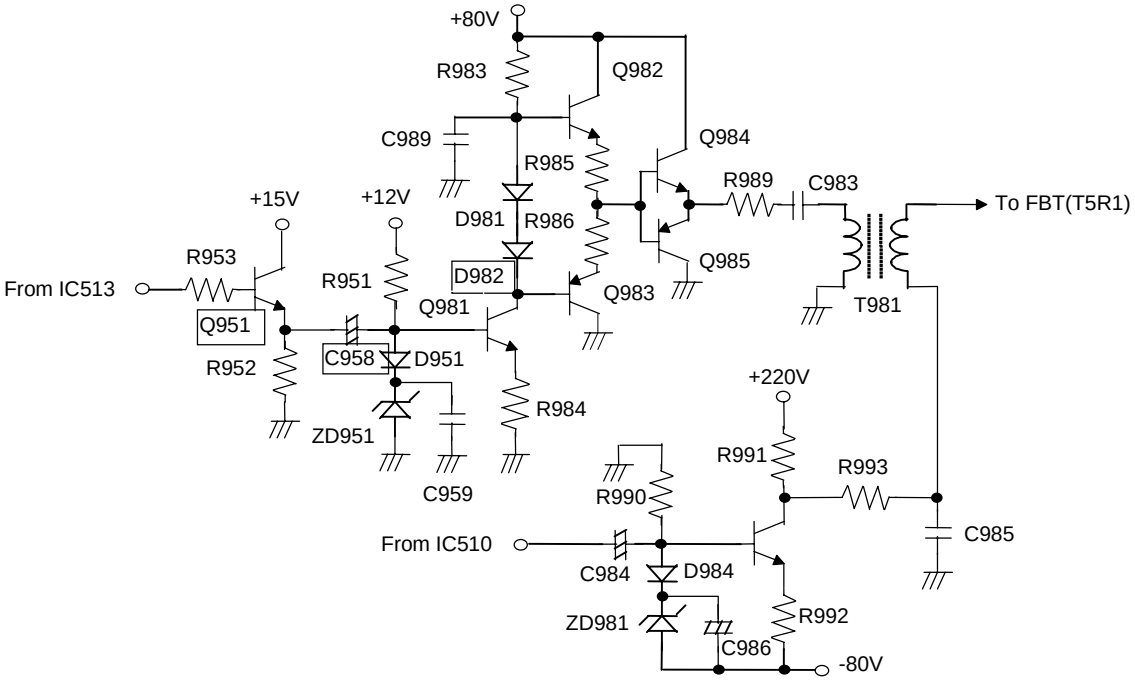


(Fig. 5.2) The vertical parabolic wave generation and gain control circuit

3) The output amplifier circuit and the coupling circuit

The horizontal and vertical parabola waveforms output from IC501 are clamped before each output circuit for wide dynamic range of the output circuit. The clamp voltage is determined by the voltages of ZD951 (for the horizontal parabolic wave) and ZD981 (for the vertical parabolic wave).

After the clamp circuit, the horizontal parabola waveform is amplified approximately 12 times by Q981. The output signal at Q981 collector is input to T981 via the buffer circuit which is composed of Q982, Q983, Q984 and Q985. The gain of T981 is approximately 9. The vertical parabola waveform is amplified approximately 80 times by Q987. The output signal at Q987 collector modulates the secondary winding of T981 as the vertical parabola waveform. Therefore, T981 outputs the horizontal parabola waveform which is modulated by the vertical waveform. This modulated waveform is input to the CRT focus grid via the built-in capacitor of T5R1 (FBT).



(Fig. 5.3) The dynamic focus output circuit

6. CPU CIRCUIT

1) CPU

IC801: 8 bit CPU / CMOS IC

IC802: EEPROM / CMOS IC

IC571: I/O Expander

This system has the following functions.

Frequency Counter

I^2C BUS control

fH band

Degaussing Control

DAC control (see 2. DC Control Circuit)

PMS control (see 3. Power Management system (PMS) Circuit)

OSD control (see 5. User Control Operation)

a. Frequency Counter

IC801 counts Horizontal frequency by event counter, Vertical frequency by interval timer. Horizontal sync is negative input to IC801 pin 4. Vertical sync is positive input to IC801 pin 36.

Sync range

Horizontal	31.0 - 130.0 kHz
Vertical	55.0 - 160 Hz

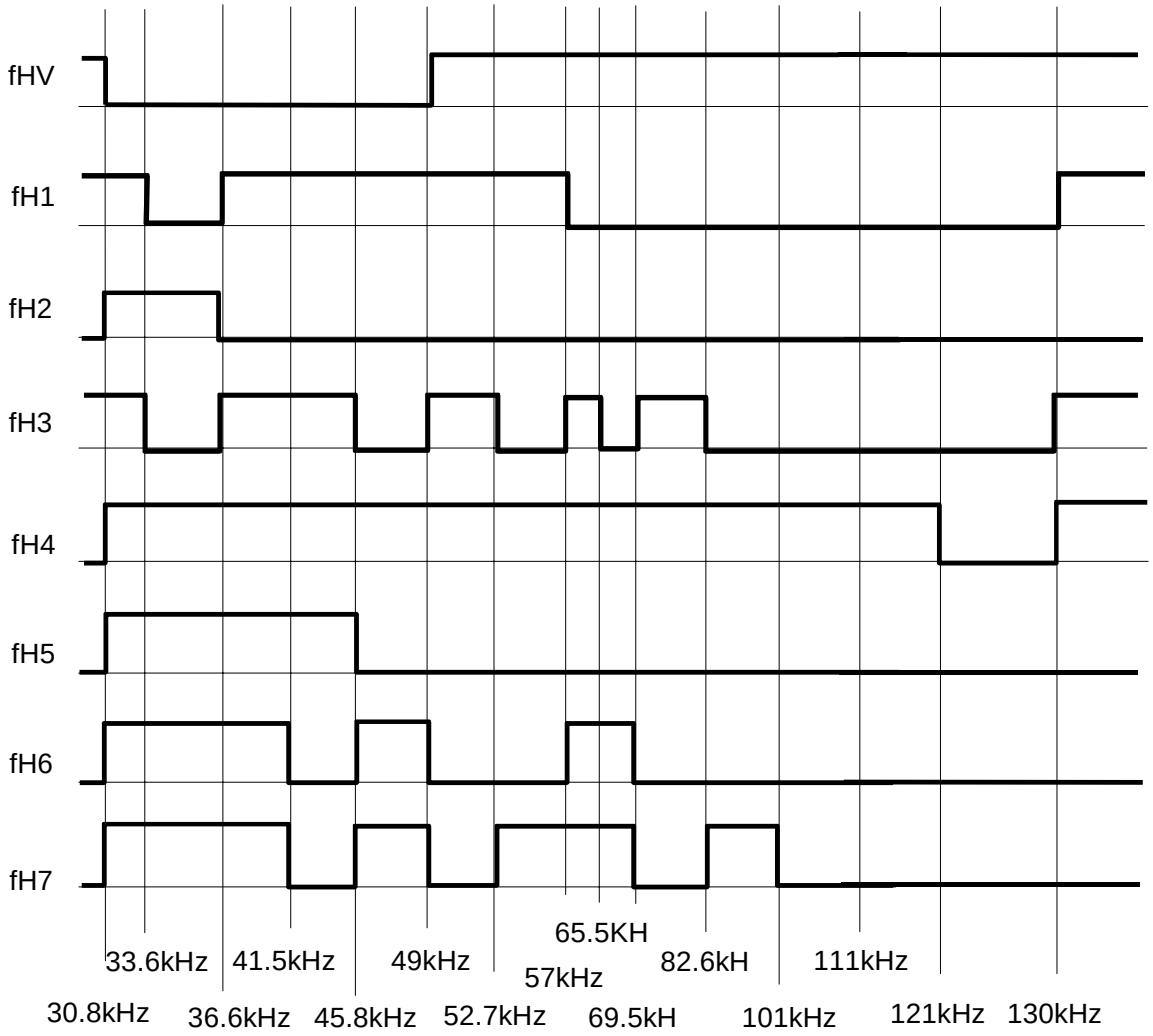
If Horizontal frequency is less than 1 kHz or Vertical frequency is less than 10 Hz, IC801 judges “NO PULSE”. And IC801 enters to “PMS MODE”.

b. I^2C BUS control

CPU (IC801) controls the following ICs through I^2C BUS.

DAC	IC751(M62393FP)、IC532(M62392FP)
PREAMP	IC711(M52742ASP)
E^2PROM	IC802(24LC08,M24C08) 、IC8A1(24LCS21A)
I/O EXPANDER	IC571(M62320FP)
OSC IC(DSP)	IC501(HE6-0092)
OSD IC	IC791(M35070-050FP)
SUB CPU	IC851(MC68HC705BD32FU)
AUTO SIZE IC	IC8M1(BU6483K)
CONVERGENCE IC	IC8U1(uPD93299GD)

c. Fh Band



(Fig. 6.1) Output fh Band status (IC571)

Attention: fH1 to 7 Band signals are output for horizontal output circuit control to keep the horizontal linearity constant.

d. Degaussing Control

Manual degaussing signal. IC801 pin 53 becomes High for 3 seconds when user presses the “PROCEED” switch while “DEGAUSS” (MENU(u) - “BRIGHTNESS & CONTRAST”) or “GLOBALSYNC” (MENU(u) - “TOOL2”) is highlighted, the monitor is powered on.

DAC - ”ROTATE”,”GLOBALSYNC” , and “CONVERGENCE” data value is set to center, while degaussing. This pin will be LOW in normal condition.

2) DC Control Circuit

CPU (IC801) controls three DAC ICs (IC532, IC751, IC711) through I^2C BUS. Its analog outputs control DAC output so that the analog voltage corresponds to the DC control data from CPU. IC802 is an EEPROM which stores the DC control data for preset graphics standard timings.

Table 1 Summary of DAC control (IC532 on DEF PWB: CS0=CS1=CS2=0)

PORT	NAME	Summary
A01	COR_LT	Corner Landing Adjustment (LEFT TOP)
A02	ROT	Raster Rotation Adjustment
A03	EMF	Earth Magnetic Field Correction
A04	H_LIN	Horizontal Linearity Adjustment
A05	FV_L2	Vertical Filter Switch 2
A06	FV_L3	Vertical Filter Switch 3
A07	FV_L1	Vertical Filter Switch 1
A08	HS	Horizontal Size Adjustment
A09	HSM	Horizontal Maximum Size Adjustment
A10	COR_RB	Corner Landing Adjustment (RIGHT BOTTOM)
A11	COR_RT	Corner Landing Adjustment (RIGHT TOP)
A12	COR_LB	Corner Landing Adjustment (LEFT BOTTOM)

Table 2 Summary of DAC control (IC751 on VIDEO PWB: CS0=1 CS1=CS2=0)

PORT	NAME	Summary
A01	-	Not in use
A02	SUB_BIAS	CRT Cut off adjustment
A03	G_BIAS	CRT Cut off adjustment (Green)
A04	G_BRT	Brightness tracking adjustment (Green)
A05	B_BRT	Brightness tracking adjustment (Blue)
A06	B_BIAS	CRT Cut off adjustment (Blue)
A07	R_BIAS	CRT Cut off adjustment (Red)
A08	R_BRT	Brightness tracking adjustment (Red)

Table 3 Summary of DAC control (IC711 on VIDEO PWB)

PORT	NAME	Summary
D/A OUT1	SHARP1	Picture sharpness control 1
D/A OUT2	SHARP2	Picture sharpness control 2 (Only Aver.)
D/A OUT3	SHARP3	Picture sharpness control 3 (Only Aver.)
D/A OUT4	GAIN_ADJ	Video gain adjustment

3) Power Management System (PMS) Circuit

PMS circuits reduce power consumption. They have 3 modes of stand-by, suspend and off.

Table 4 PMS Mode (IC801)

Mode	Pin 22 PMS_SUS#	Pin 8 PMS_OFF#	Pin 54 POWER LED
On	High	High	Low
Stand-by	High	High	Low
Suspend	Low	High	Pulse(1KHz)
Off	Low	Low	High

a. Stand-by Mode

When the horizontal sync is not input, this monitor enters stand-by mode in a few seconds. The video signal of IC711 pin 29, 32, 35 are stopped by the video blank signal from IC801 pin 10. Then CPU (IC801) controls the DAC outputs of the I/O Expander(IC571) to high. (fH1～fH3 and fH5～fH7 becomes high.)

When the horizontal sync is input, this monitor returns to normal operation mode with the shortest recovery time.

b. Suspend Mode

When the vertical sync is not input, this monitor enters suspend mode in a few seconds. IC801 outputs pulse(1kHz) from pin 54. Because Q101 and Q102 toggle on-off alternately, LED111,LED112 and LED113 turn yellow. IC801 pin 22 outputs low to operate each power saving circuit. When the vertical sync is input to this monitor, it becomes normal operation mode with longer recovery time than stand-by Mode.

c. OFF mode

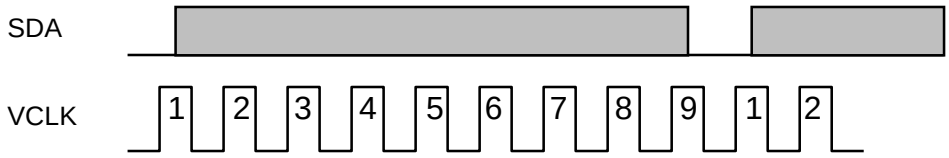
When the horizontal sync and vertical sync are not input, this monitor enters off mode in a few seconds. IC801 pin 8 becomes low, then IC8G2 (5V regulator) turns off.

4) Plug and Play (DDC 1 / 2)

VESA Display Data Channels (DDC)

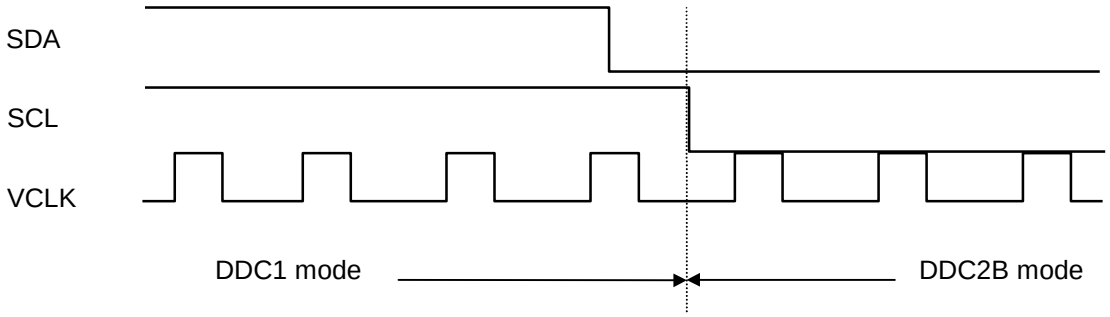
a. DDC1

When the monitor is turned on, the operation mode starts in DDC1 mode. When the VCLK (SYNC) is provided to IC8A1 pin 7, serial data stream is generated from the IC8A1 pin 5 by synchronizing with the rising edge of the VCLK. The contents of the serial data (SDA) is called EDID, and it contains the information of monitor's specification and supported signals. The EDID is composed of 8 bits, 128 bytes, but the individual data is composed of 9 bits. The 9th bit is always low and is ignored. If 128 bytes are finished to generate, then the 24LCS21A starts to generate the first byte. This operation lasts continuously until the operation mode changes to DDC2B.



b. DDC2B

When the SCL (IC8A1 pin 6) input is changed from high to low, the operation mode changes from DDC1 to DDC2B. The output data is the same as DDC1 (EDID), but the communication protocol is different. In DDC2B mode, the serial data is communicated by I^2C-bus protocol. The operation mode never go back from DDC2B to DDC1 except by turning off the monitor.



5) User Control Operation

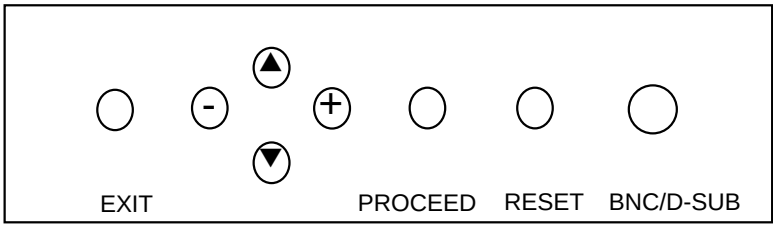
User Control Interface (IC801)

Table 5 Input (IC801)

Pushed SW	pin 33	pin 32	pin 34	pin 31	pin 30	pin 29	pin 28	pin27
EXIT	Low	High	High	High	High	High	High	High
-	High	Low	High	High	High	High	High	High
▼	High	High	Low	High	High	High	High	High
▲	High	High	High	Low	High	High	High	High
+	High	High	High	High	Low	High	High	High
PROCEED	High	High	High	High	High	Low	High	High
RESET	High	High	High	High	High	High	Low	High
BNC/D-SUB	High	High	High	High	High	High	High	Low

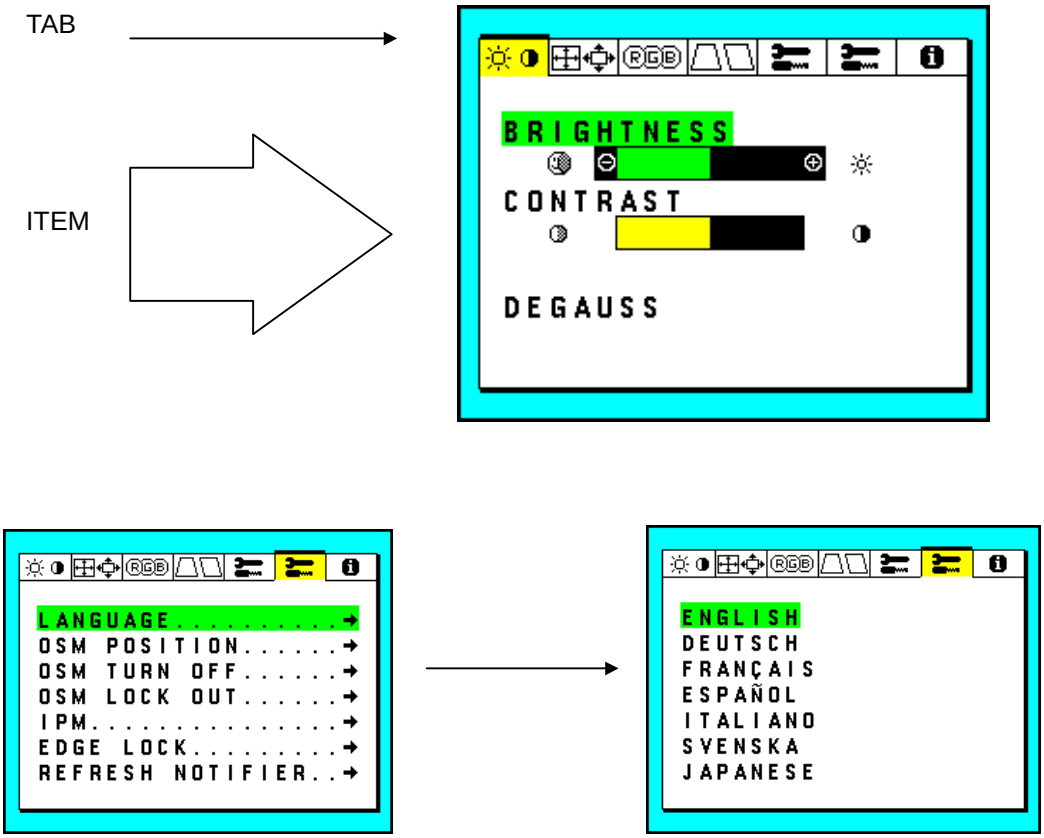
① OSD

This model is adjusted through OSD (On Screen Display ; it is called OSM™ in the USA), by operating Control Panel. It is located on the lower center of front panel.

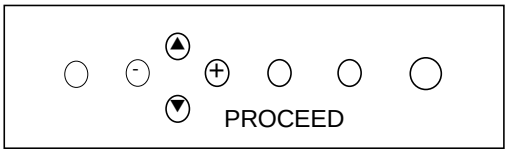


(Fig. 6.2) Control Panel

② OSM MENU structure is as below. (It is structured “TAB”, “SUB MENU”)



press “PROCEED”



(Fig. 6.3) SUB MENU

Table 6 USER CONTROL SWITCH FUNCTION

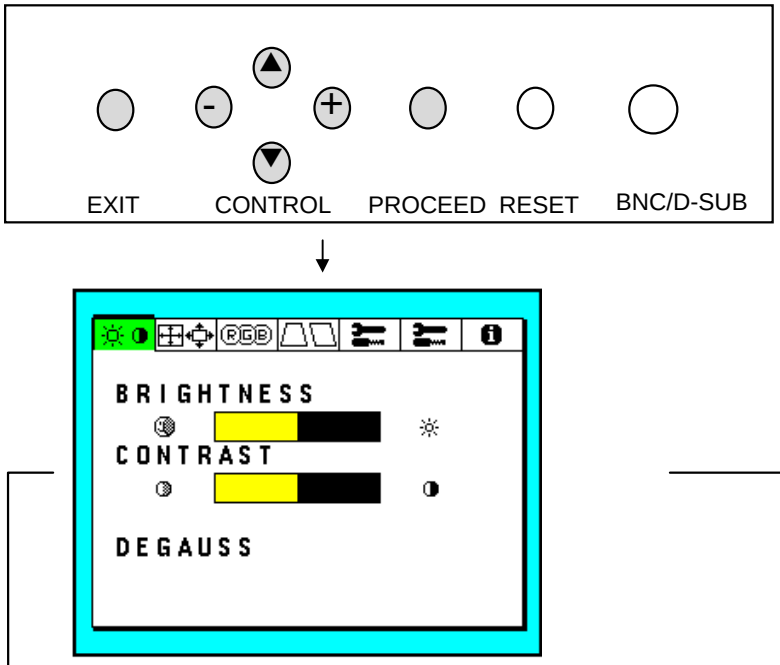
MENU / KEY		“EXIT”	“−”	“+”	“▲”	“▼”	“PROCEED”
TAB	TAB		○	○			
TAB	ITEM					○	
ITEM	SUBMENU						○
ITEM	ITEM				○	○	
SUBMENU	ITEM	○					
ITEM	TAB	○			○*	○**	
ALLITEM	TAB	○					

* : Valid only if highlighted bar is on top ITEM

** : Valid only if highlighted bar is on bottom ITEM

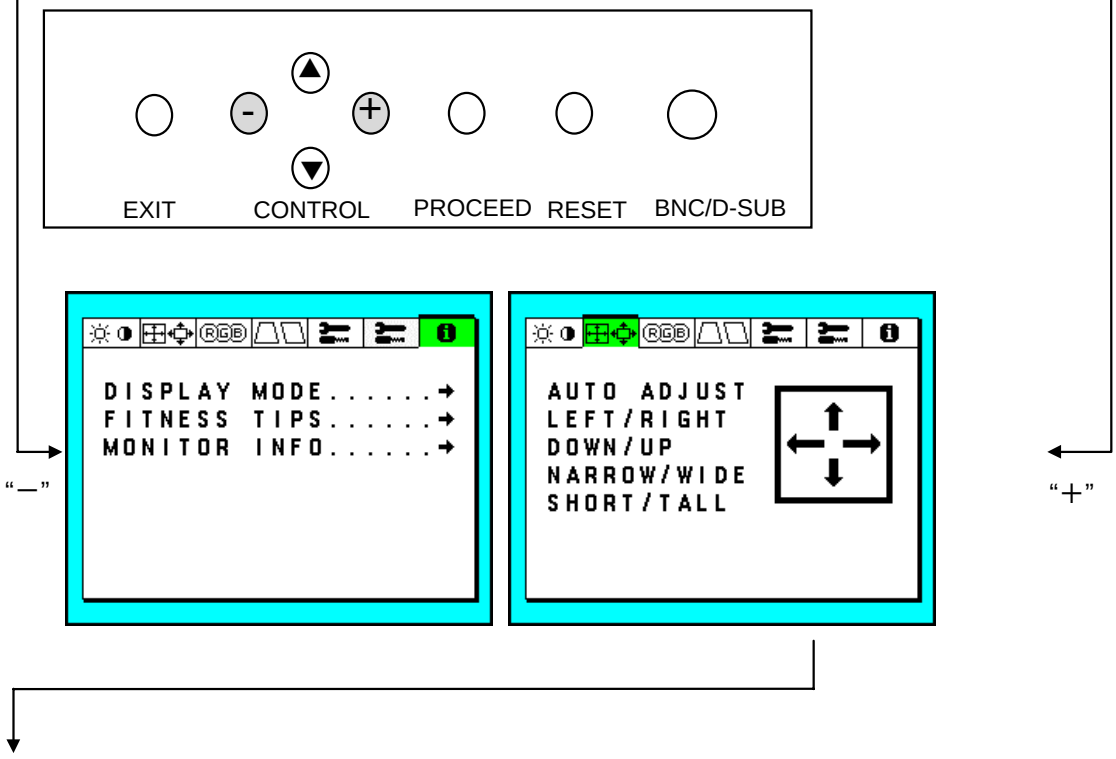
③ How to display OSM MENU

MENU(u) : Press “EXIT” or “－”, “＋”, “▲”, “▼”, “PROCEED” once when OSM MENU is not displayed.

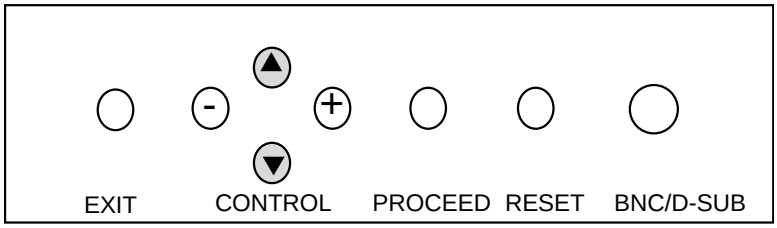


④ How to change TAB

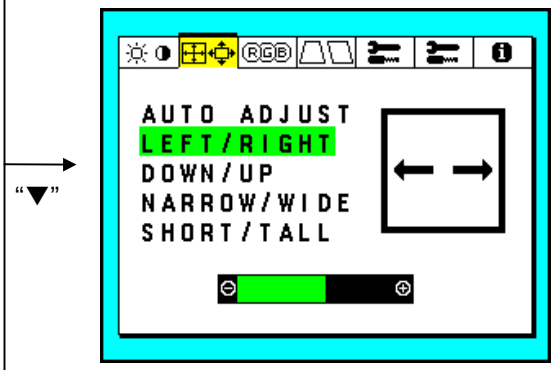
press “－” OR “＋” switch while highlighted bar is on TAB



⑤ Select ITEM

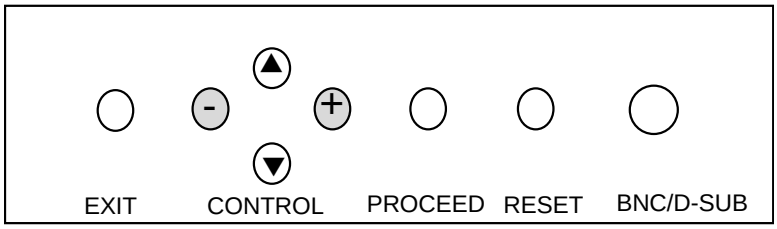


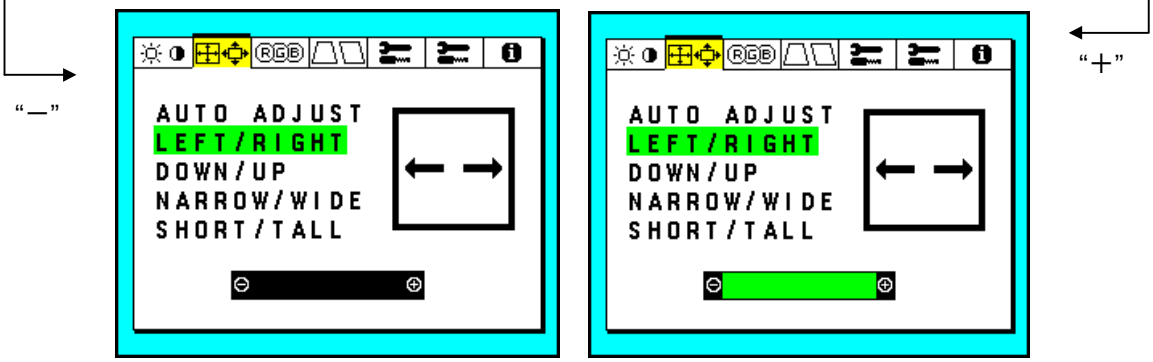
Press "▲" or "▼" switch



6) Change DATA Value

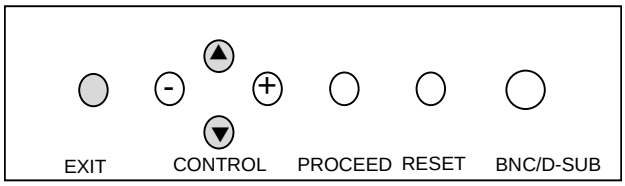
Press "－" or "＋" switch while highlighted BAR is on ITEM





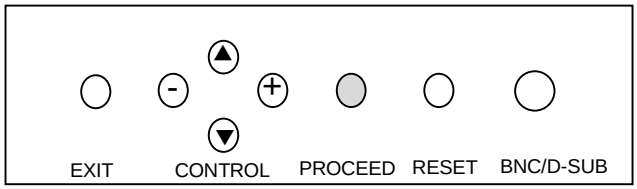
7) Save DATA Value To Memory

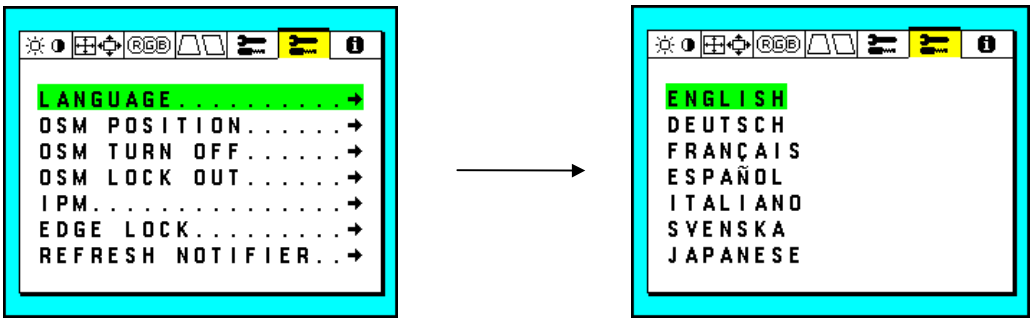
Move highlighted BAR to other “ITEM” or “TAB” (press “EXIT” or “▼”, “▲”)



8) Open SUB MENU

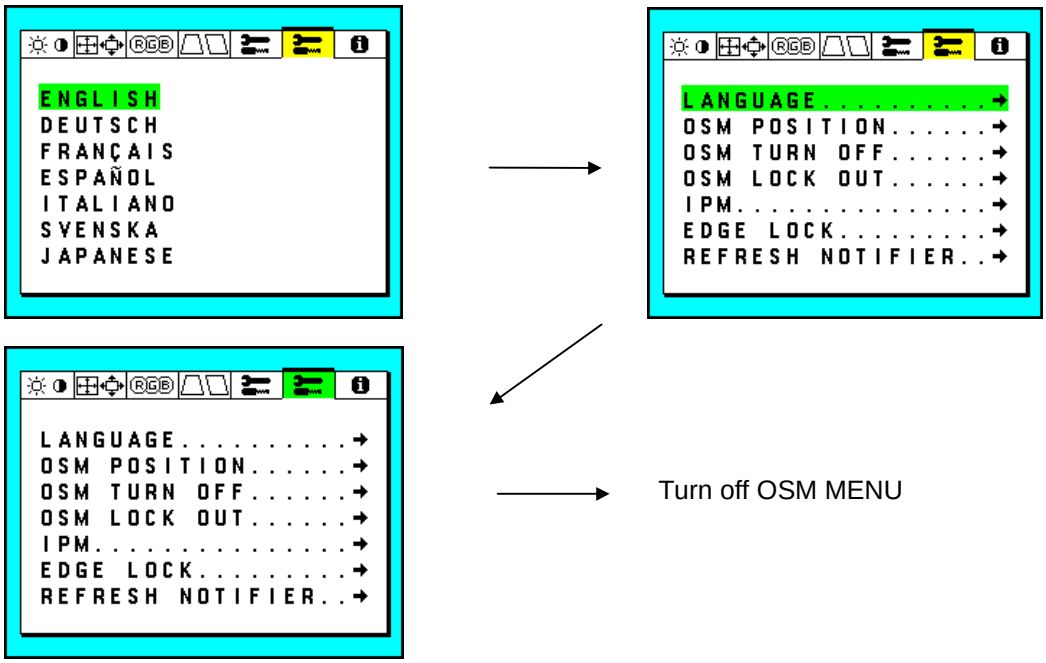
Press “PROCEED” switch when the highlighted “ITEM” contains “..→”





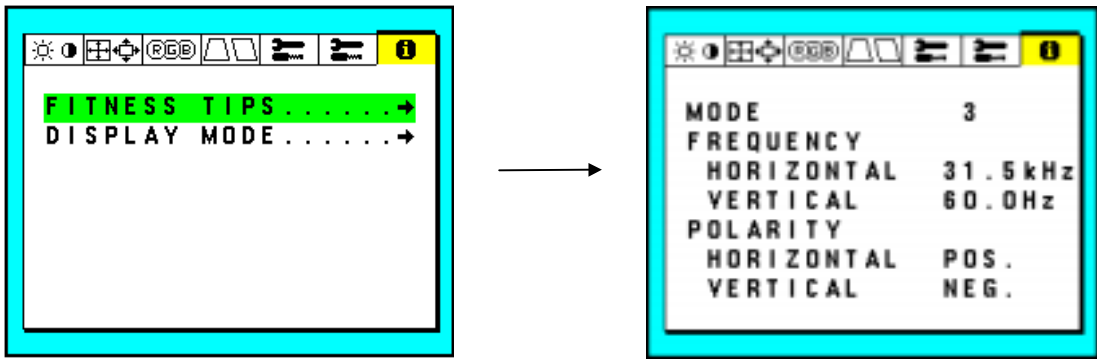
9) Turn off OSM MENU

Press “EXIT” switch once : when highlighted BAR is on “TAB”
twice : when highlighted BAR is on “TAB”
three times : when entering “SUB MENU”

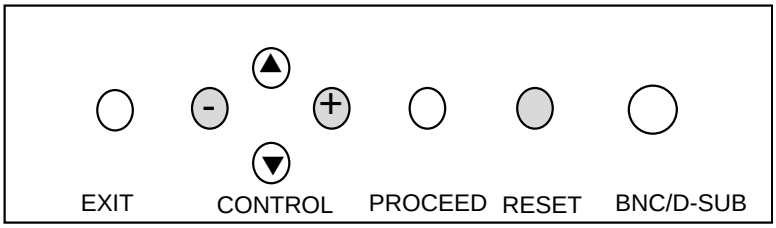


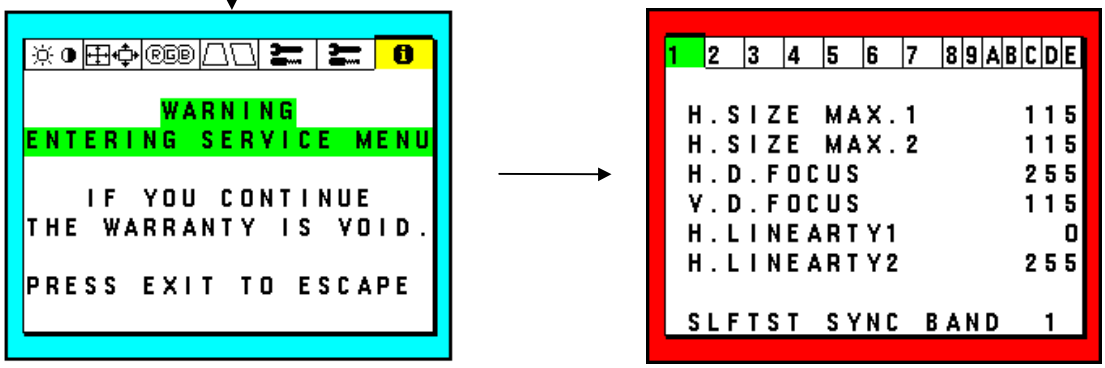
10) Open MENU(S)

Open menu “INFORMATION” - “DISPLAY MODE”



then press “RESET” and “＋”, “－” switch at same time



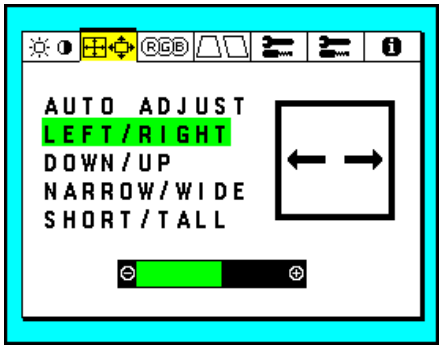


A warning message will be displayed, then press “PROCEED”

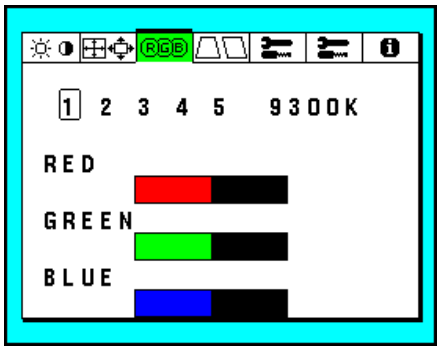
・OSM MENU Structure

1. MENU (u)

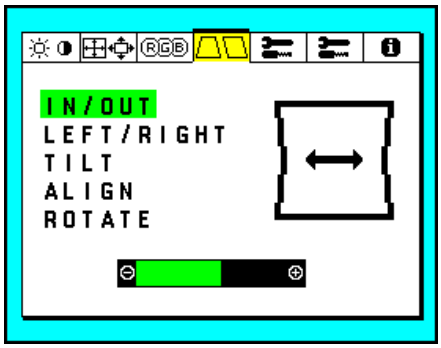
(Fig. 6.4) MENU(u) - “BRIGHTNESS&CONTRAST”



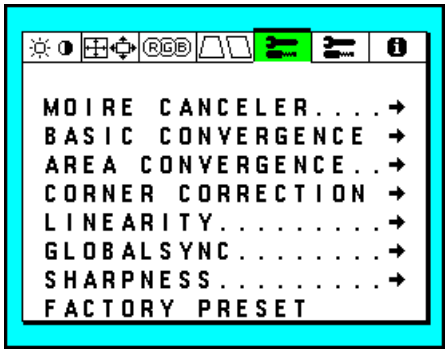
(Fig. 6.5) MENU(u) - “SIZE & POSITION”



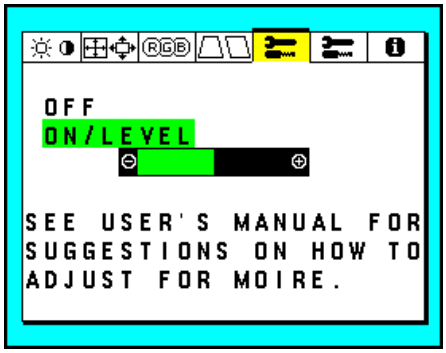
(Fig. 6.6) MENU (u) - “RGB”



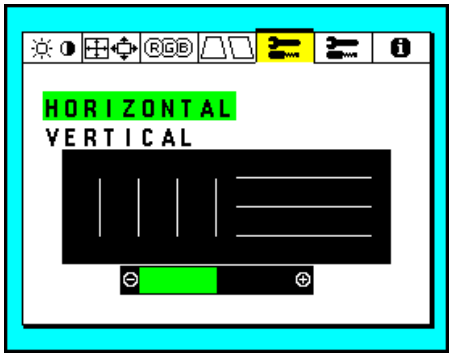
(Fig. 6.7) MENU(u) “GEOMETRY”



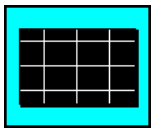
(Fig. 6.8) MENU(u) - “TOOL1”



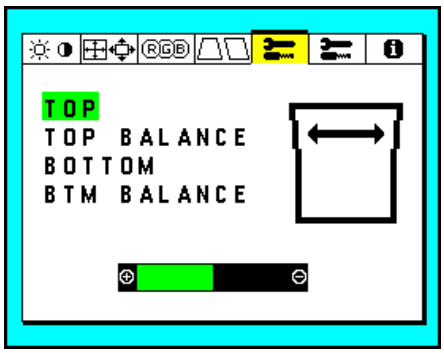
(Fig. 6.9) SUB MENU(u) - “MOIRE CANCELER”



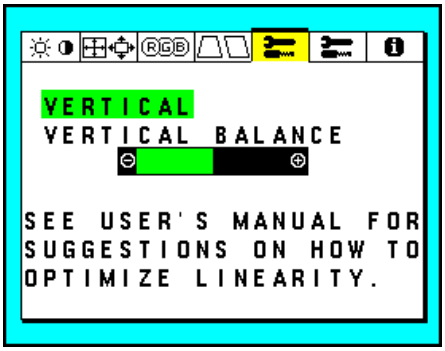
(Fig. 6.10) SUB MENU(u) - “BASIC CONVERGENCE”



(Fig. 6.11) SUB MENU(u) - “AREA CONVERGENCE”

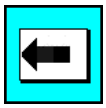


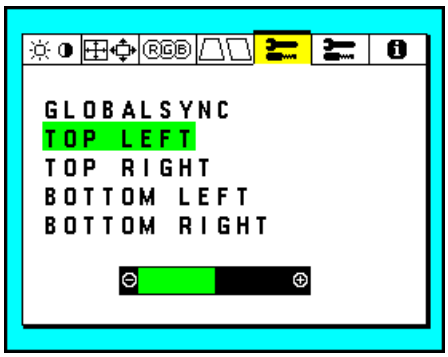
(Fig. 6.12) SUB MENU(u) - “CORNER CORRECTION”



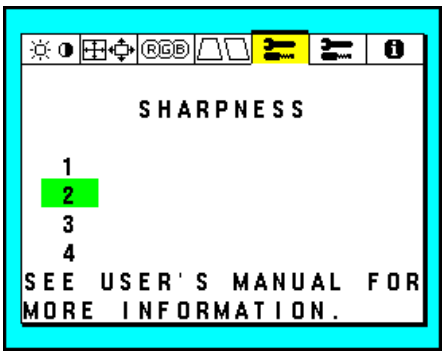
(Fig. 6.13) SUB MENU(u) - “LINEARITY”

(Fig. 6.14) SUB MENU(u) - “GLOBALSYNC 1”





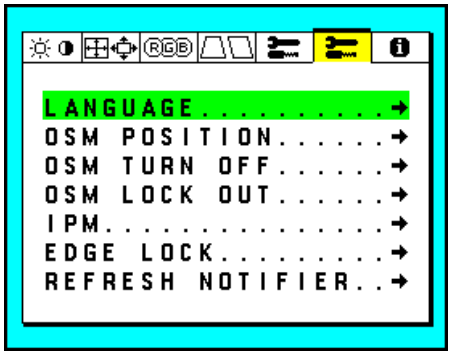
(Fig. 6.15) SUB MENU(u) - “GLOBALSYNC 2”



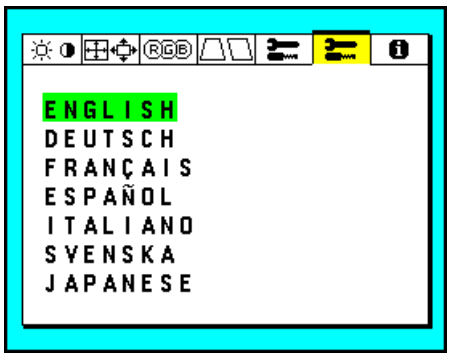
(Fig. 6.16) SUB MENU(u) -“SHARPNESS”

*Ex; American Version

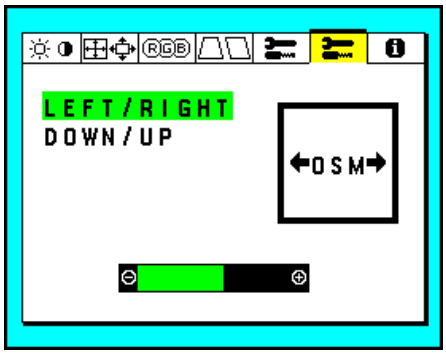
(Fig. 6.17) MENU(u) - “FACTORY PRESET”



(Fig. 6.18) SUB MENU(u) - “TOOL2”

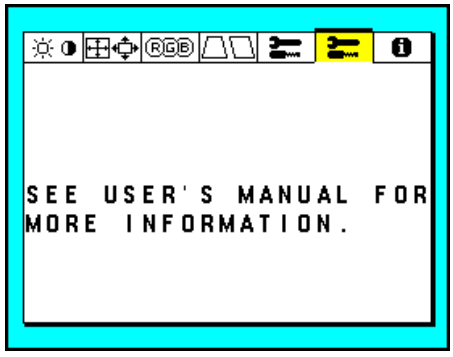


(Fig. 6.19) MENU(u) - “LANGUAGE”

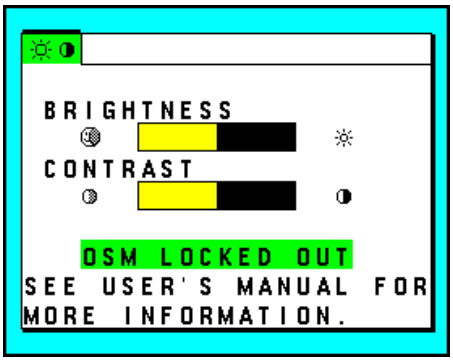


(Fig. 6.20) SUB MENU(u) - “OSM POSITION”

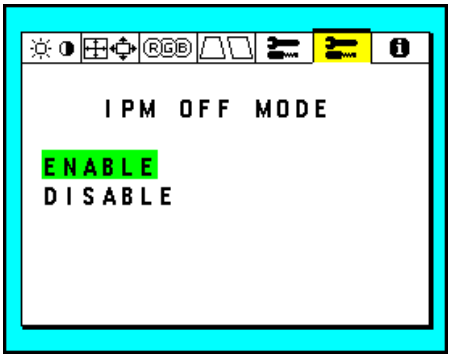
(Fig. 6.21) SUB MENU(u) - “OSM TURN OFF”



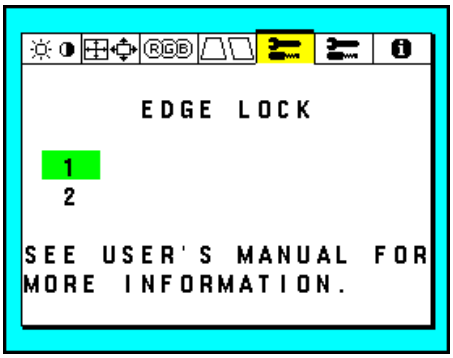
(Fig. 6.22) SUB MENU(u) - “OSM LOCK OUT1”



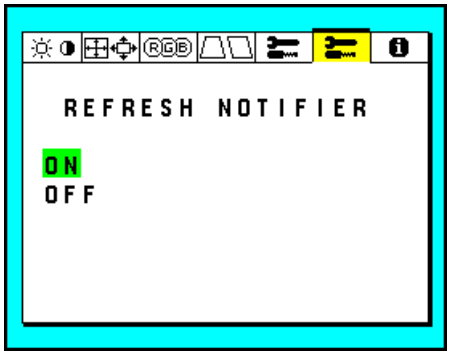
(Fig. 6.23) SUB MENU(u) - “OSM LOCK OUT2”



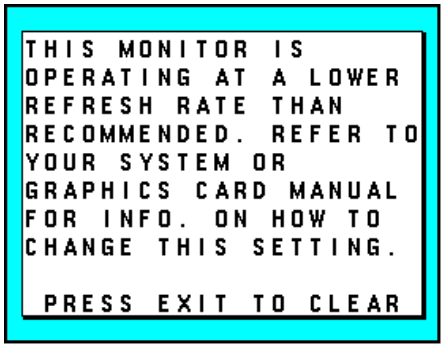
(Fig. 6.24) SUB MENU(u) - “IPM OFF MODE”



(Fig. 6.25) SUB MENU (u) - “EDGE LOCK”

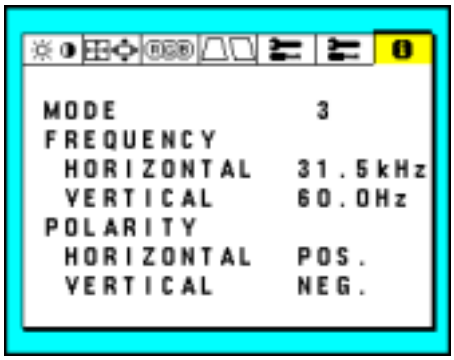


(Fig. 6.26) SUB MENU(u)- “REFRESH NOTIFIER”



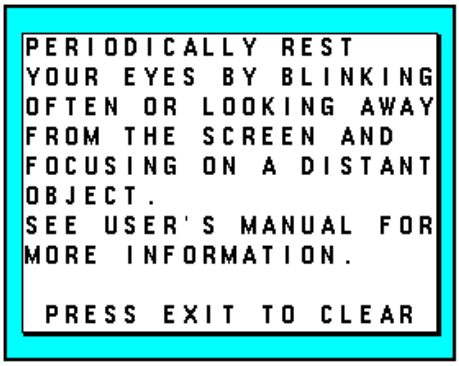
(Fig. 6.27) “REFRESH NOTIFIRE” MESSAGE“

(Fig. 6.28) MENU(u) - “INFORMATION”

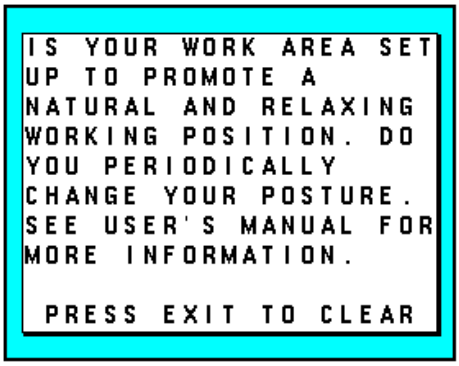


(Fig. 6.29) SUB MENU(u) - “DISPLAY MODE”

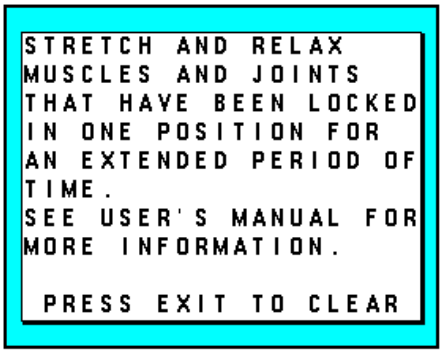
(Fig. 6.30) SUB MENU(u) - “FITNESS TIPS”



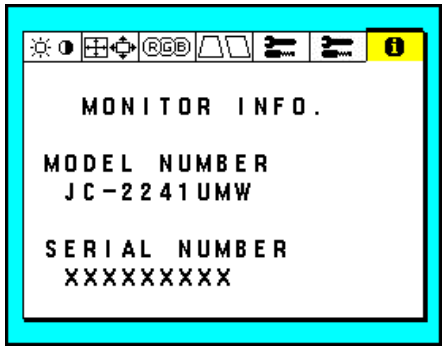
(Fig. 6.31) “FITNESS TIPS” MESSAGE-1



(Fig. 6.32) “FITNESS TIPS” MESSAGE-2

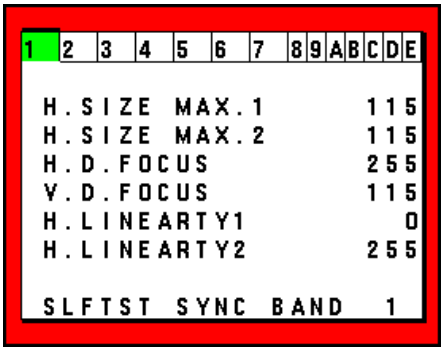


(Fig. 6.33) "FITNESS TIPS" MESSAGE-3

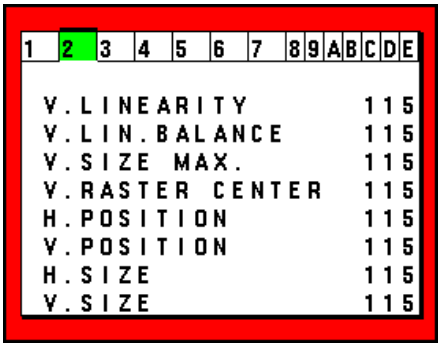


(Fig. 6.34) SUB MENU(u) - "MONITOR INFO."

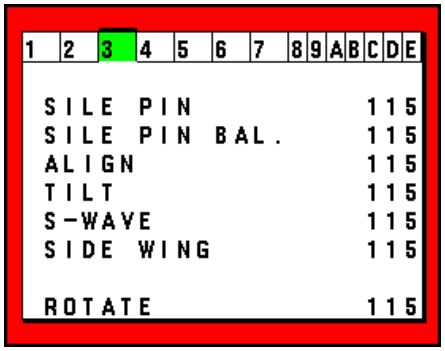
2. MENU(s)



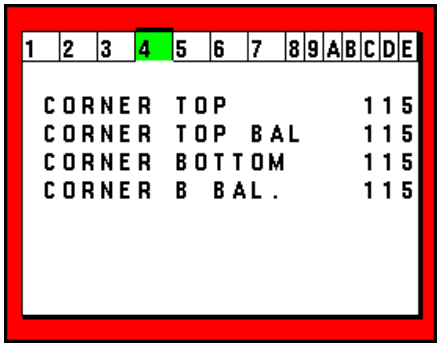
(Fig. 6.35) MENU(s) - TAG1



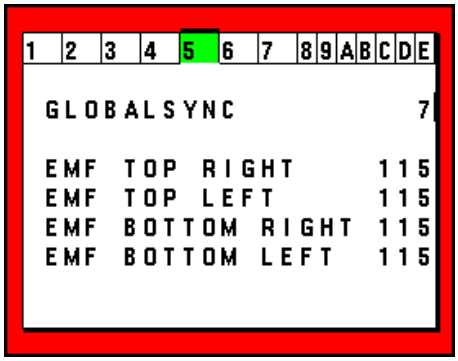
(Fig. 6.36) MENU(s) - TAG2



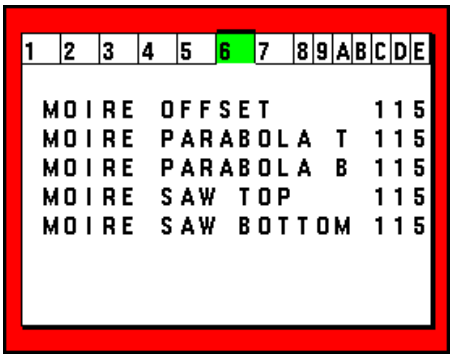
(Fig. 6.37) MENU(s) - TAG3



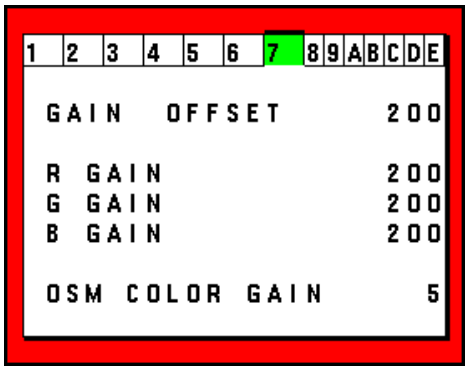
(Fig. 6.38) MENU(s) - TAG4



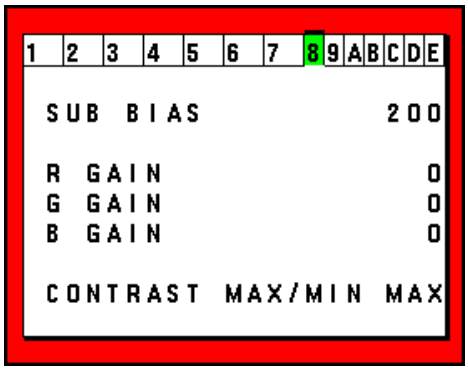
(Fig. 6.39) MENU(s) - TAG5



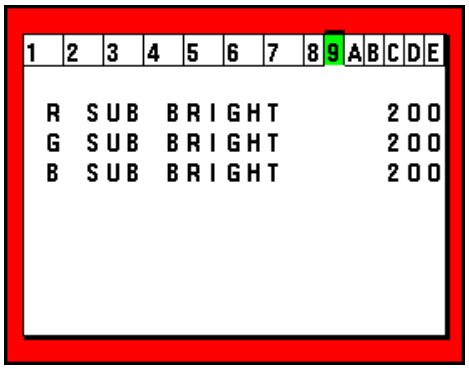
(Fig. 6.40) MENU(s) - TAG6



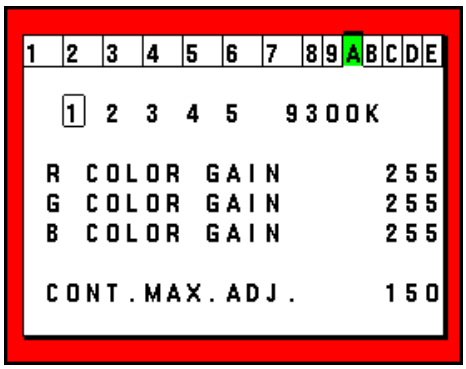
(Fig. 6.41) MENU(s) - TAG7



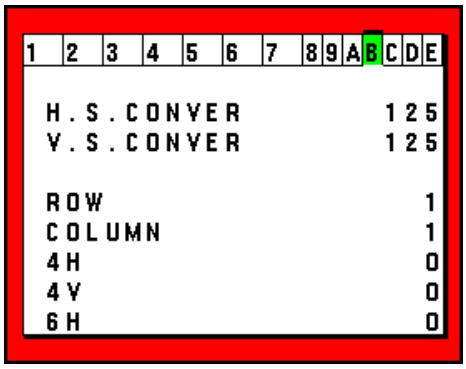
(Fig. 6.42) MENU(s) - TAG8



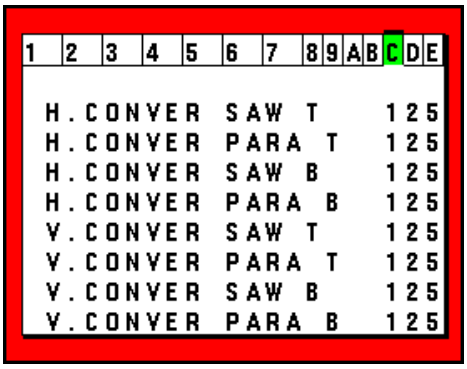
(Fig. 6.43) MENU(s) - TAG9



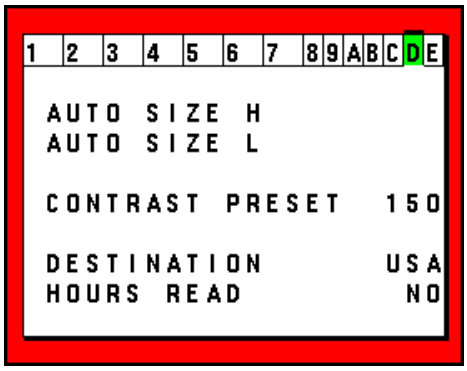
(Fig. 6.44) MENU(s) - TAG A



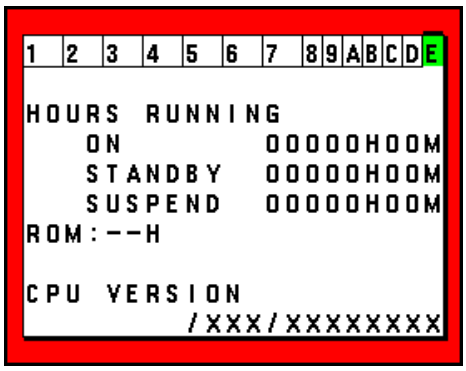
(Fig. 6.45) MENU(s) - TAG B


1 2 3 4 5 6 7 8 9 A B C D E
H.CONVER SAW T 125
H.CONVER PARA T 125
H.CONVER SAW B 125
H.CONVER PARA B 125
V.CONVER SAW T 125
V.CONVER PARA T 125
V.CONVER SAW B 125
V.CONVER PARA B 125

(Fig. 6.46) MENU(s) - TAG C



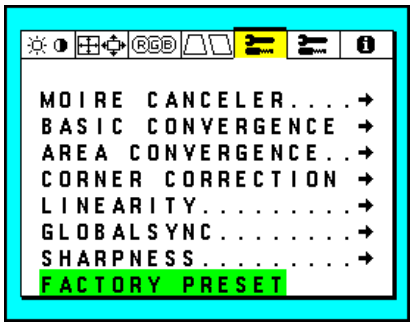
(Fig. 6.47) MENU(s) - TAG D



(Fig. 6.48) MENU(s) - TAG D

Factory Preset

Open Menu (u) - “TOOL1”, then move highlighted BAR to “FACTORY PRESET”



“Warning message” will be displayed, when “RESET” switch is pressed.

All user setting are set to “FACTORY PRESET” value when “PROCEED” switch is pressed.

Table 11 FACTORY PRESET

TAB	ITEM	preset value
BRIGHTNESS & CONTRAST	BRIGHTNESS	SET TO FACTORY PRESET
	CONTRAST	A/R/AS ver.:MAXIMUM B ver.:90cd
	DEGAUSS	---
SIZE & POSITION	ALL ITEMS	SET TO FACTORY PRESET
RGB	12345	NO. 1 (9300K)
	RED, GREEN, BLUE	SET TO FACTORY PRESET
GEOMETRY	ALL ITEMS	SET TO FACTORY PRESET
TOOL1	MOIRE CANCELER	MODE : OFF LEVEL : MINIMUM
	BASIC CONVERGENCE	SET TO FACTORY PRESET
	AREA CONVERGENCE	SET TO FACTORY PRESET
	CORNER CORRECTION	SET TO FACTORY PRESET
	LINEARITY	SET TO FACTORY PRESET
	GLOBALSYNC	SET TO FACTORY PRESET
	SHARPNESS	MODE 2
TOOL2	LANGUAGE	NO CHANGE
	OSM POSITION	SET TO FACTORY PRESET
	OSM TURN OFF	30 SECONDS
	OSM LOCK OUT	---
	IPM	NO CHANGE
	EDGE LOCK	NO CHANGE
	REFRESH NOTIFIER	MODE:OFF
INFORMATION	FITNESS TIPS	OFF

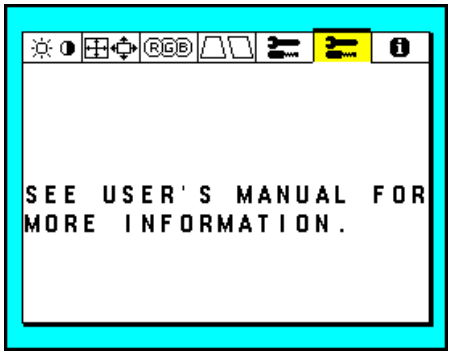
FITNESS TIPS

How to confirm “FITNESS TIPS” message.

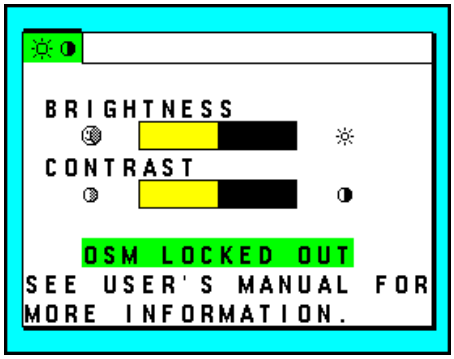
1) Open SUB MENU (u) - “INFORMATION” - “FITNESS TIPS”
2) Press “＋” and “－” switch together, then message will be displayed.
3) Press “＋” switch, then message will change.
4) Press “＋” switch, then message will change.
5) Press “＋” switch, the SUB MENU(u) - “INFORMATION” - “FITNESS TIPS” will be displayed.

OSM LOCK OUT

1) Open MENU (u) - “TOOL2”
2) Move highlighted BAR to “OSM LOCK OUT”
3) Press “PROCEED” switch while “OSM LOCK OUT” is highlighted, then message will be displayed as below.



4) Press “▲” and “PROCEED” switch together, then message will be displayed as below, and OSM is locked out.



5) Any control switch does not work while OSM is locked out.

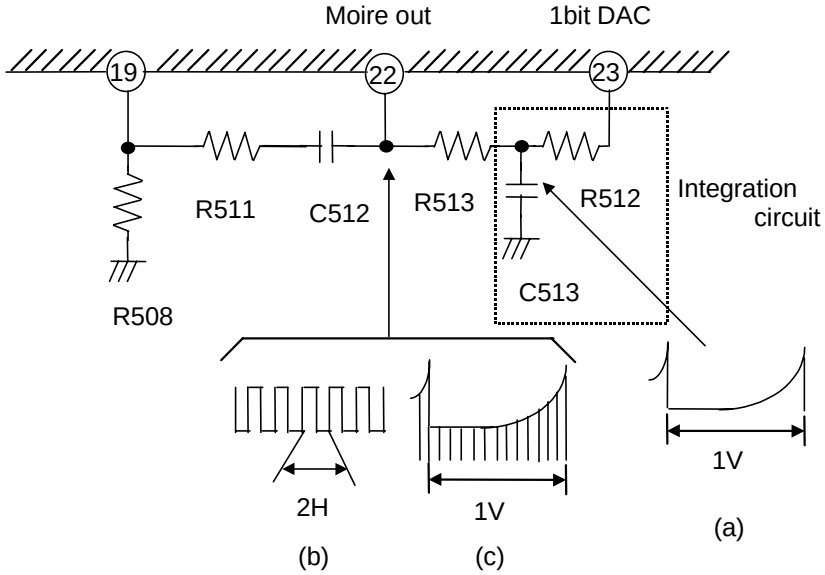
6) To unlock “OSM LOCK OUT”, press “▲” and “PROCEED” switch together when the above message is displayed.

7. MOIRE CANCELLER

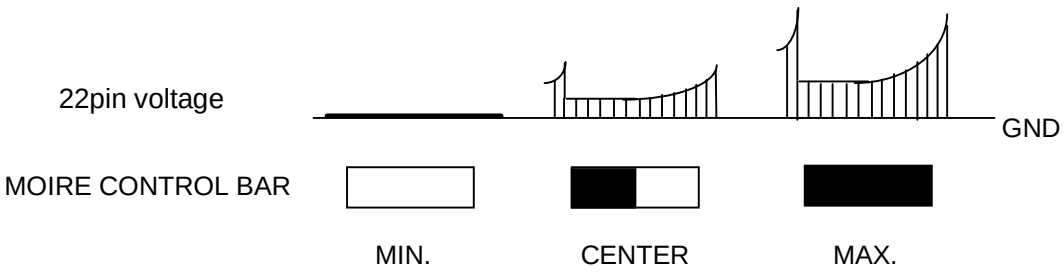
MOIRE canceler circuit is constructed by IC501 and its peripheral circuits. IC501 generates moire canceling signal which the period is double the horizontal and vertical wave signals controlled by MPU data. The moire canceling signal which is modulated by vertical period is output from 1bit D/A converter at pin 23. The output signal at pin 23 is integrated by integrated circuit which is composed of R512 and C513.

The waveform at C513 is vertical periodic signal shown on the diagram (a). The function of this signal is to cancel moire in all screen area with changing vertical modulation value. When the moire cancel function is activated, pin 22 outputs the square wave signal shown on the diagram (b). This square wave signal is combined with C513 signal by R513, and the combined signal is added to pin 19 via C512 and R511. Pin 22 output signal is shown on this diagram (c). When moire canceler control is operated, the signal at pin 22 is shown on the Fig. 7.2.

Moire cancel vertical modulation items in OSM menu such as “MOIRE SAW TOP” and “MOIRE PARABOLA T” are set to fixed value. These control items do not have to be adjusted.



(Fig. 7.1) MOIRE canceler circuit

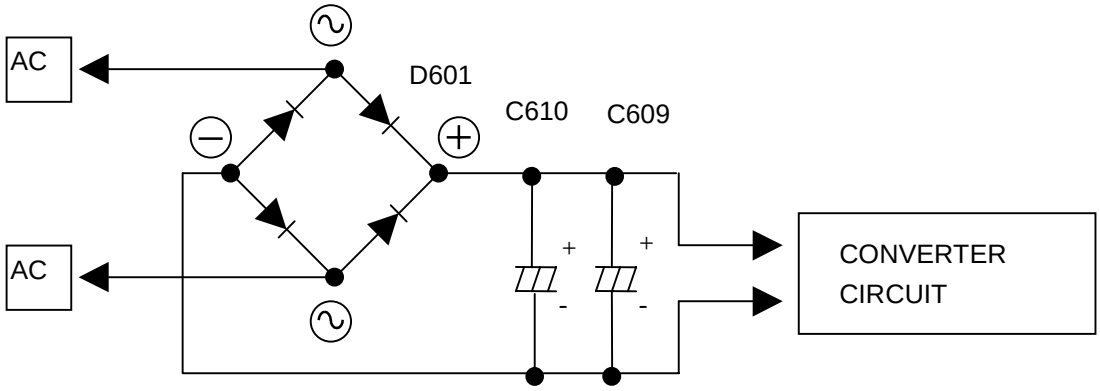


(Fig.7.2) 22 pin voltage when moire canceler is operated.

8. SWITCHING REGULATOR CIRCUIT

8-1. Rectifying and Smoothing Circuit

AC input is rectified by D601. Then, it is smoothed by C610 and C609.
The resulting DC voltage is supplied to the converter circuit.



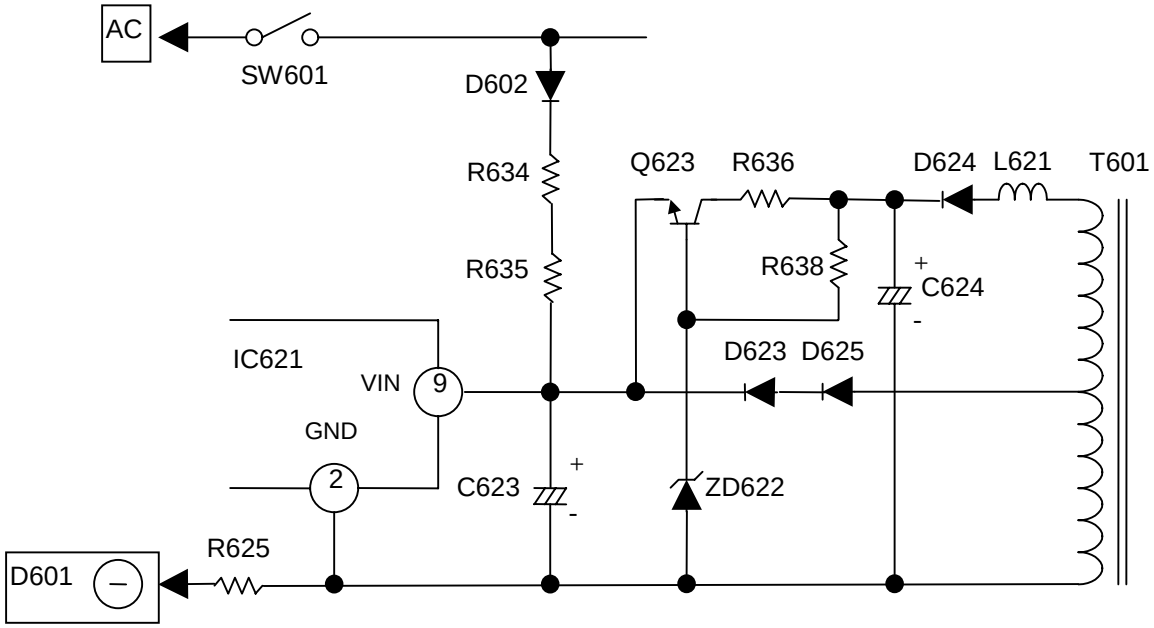
(Fig. 8-1) Rectifying and Smoothing Circuit

8-2. Auxiliary Power Supply Circuit

The auxiliary power supply circuit need to activate IC621. When the power switch is turn on, the current flows into the capacitor C623 through R634, R635 and D602. Oscillation starts when the voltage of IC621 pin 9 reaches 8V by this action.

After the start of oscillation, the fly-back voltage of the auxiliary winding of T601 is rectified and smoothed by D625,D623 and C623.

The resulting DC voltage is supplied to IC621 pin 9.

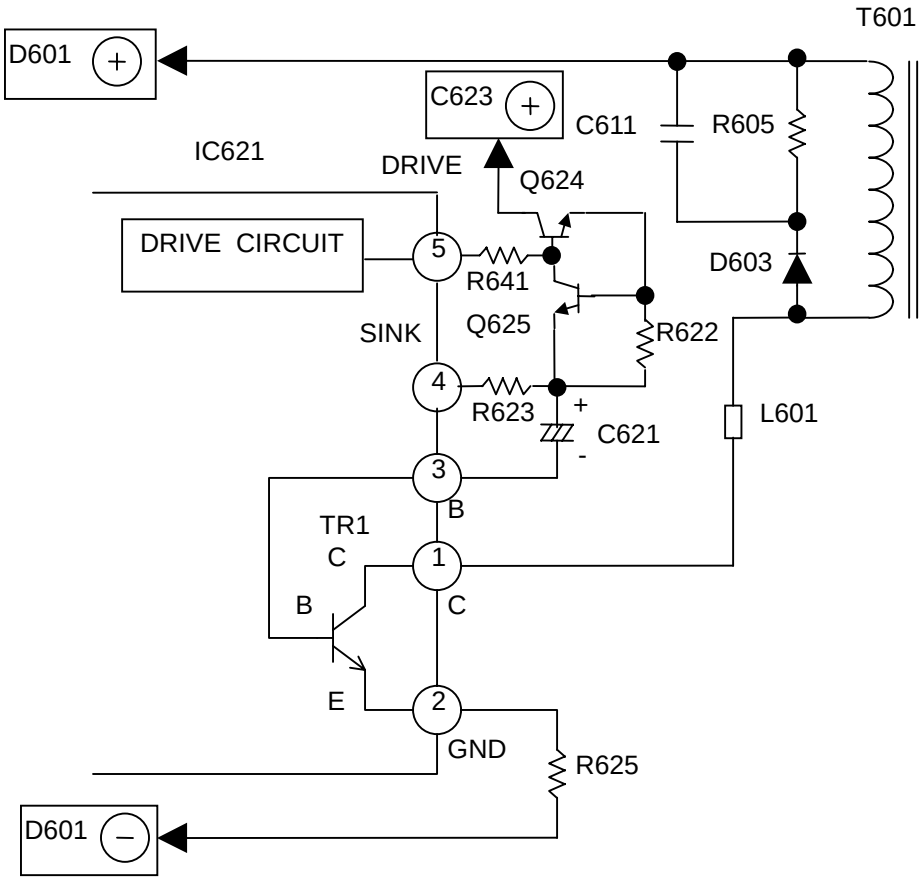


(Fig.8-2) Auxiliary Power Supply Circuit

8-3. Converter Circuit

The converter circuit consists of the primary winding of T601, a switching device TR1(internal IC621) and surge absorbers (C611, R605 and D603) which are connected to the primary winding of T601.

The oscillating signal through IC621 pin 5,Q624,R622 and C621 applied to IC621 pin 3(the base of TR1) so that the collector-emitter is turned ON and OFF. In result, the oscillating voltage is applied to the primary winding of T601.

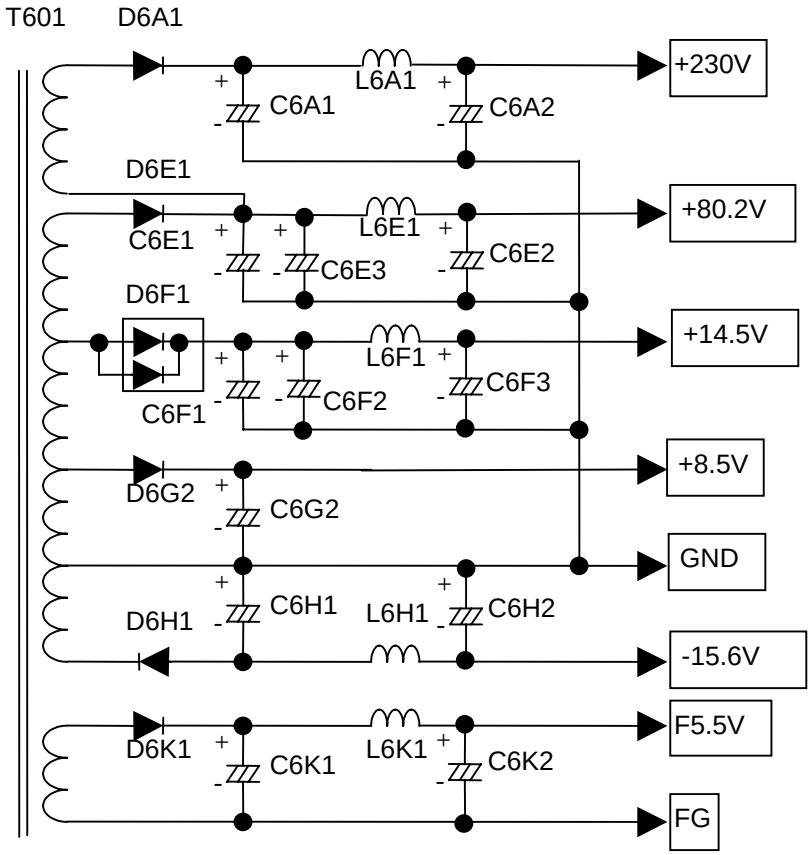


(Fig.8-3) Converter Circuit

8-4. Output Rectifying and Smoothing Circuit

The fly-back voltages which are generated at the secondary windings of T601 are rectified by D6A1, D6E1, D6F1, D6G2, D6H1 and D6K1. Then, these voltages are smoothed by C6A1, C6A2, C6E1, C6E2, C6F1, C6F2, C6F3, C6G2, C6H1, C6H2, C6K1 and C6K2 so that DC voltages are obtained.

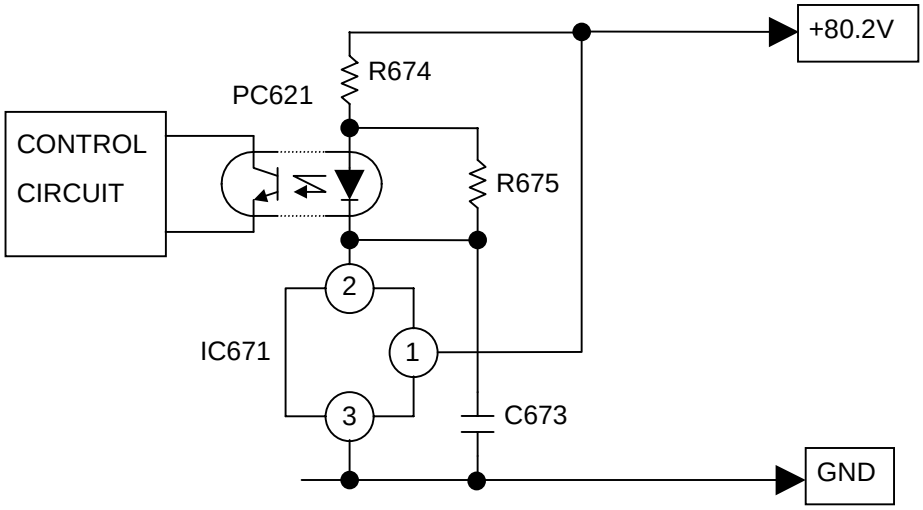
The DC voltages are maintained constantly by controlling the ON period duty cycle of TR1 (internal IC621) in the converter circuit.



(Fig.8-4) Output Rectifying and smoothing Circuit

8-5. Error Detection Amplifier Circuit

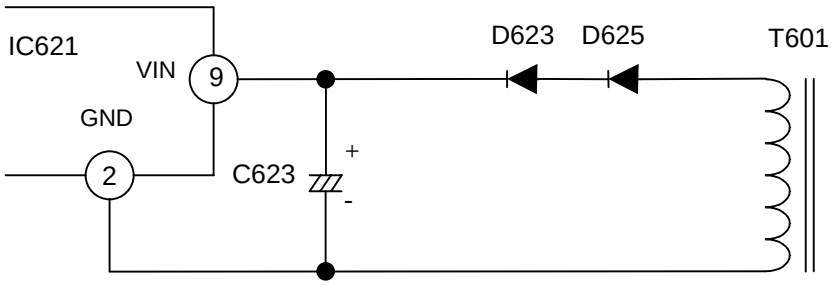
The output voltage +80.2V is compared with the reference voltage at the error amplifier IC671.
An error signal is applied to the control circuit via the photocupler PC621.



(Fig.8-5) Error Detection Amplifier Circuit

8-6. Over Voltage Protection

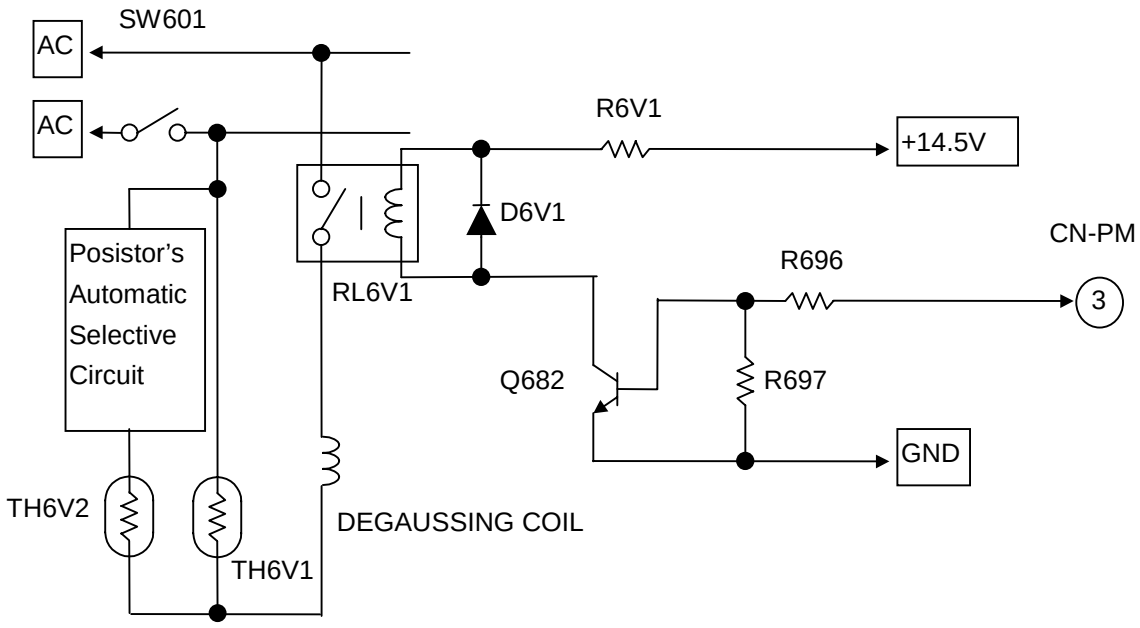
If some failure occurs and the output voltage of the secondary windings of T601 increase, the voltage of the auxiliary winding of T601 also increase proportionally. When the voltage of C623 and IC621 pin 9 increase. This action will stop the oscillator with in IC.



(Fig.8-6) Over Voltage Protection

8-7. Degaussing Circuit

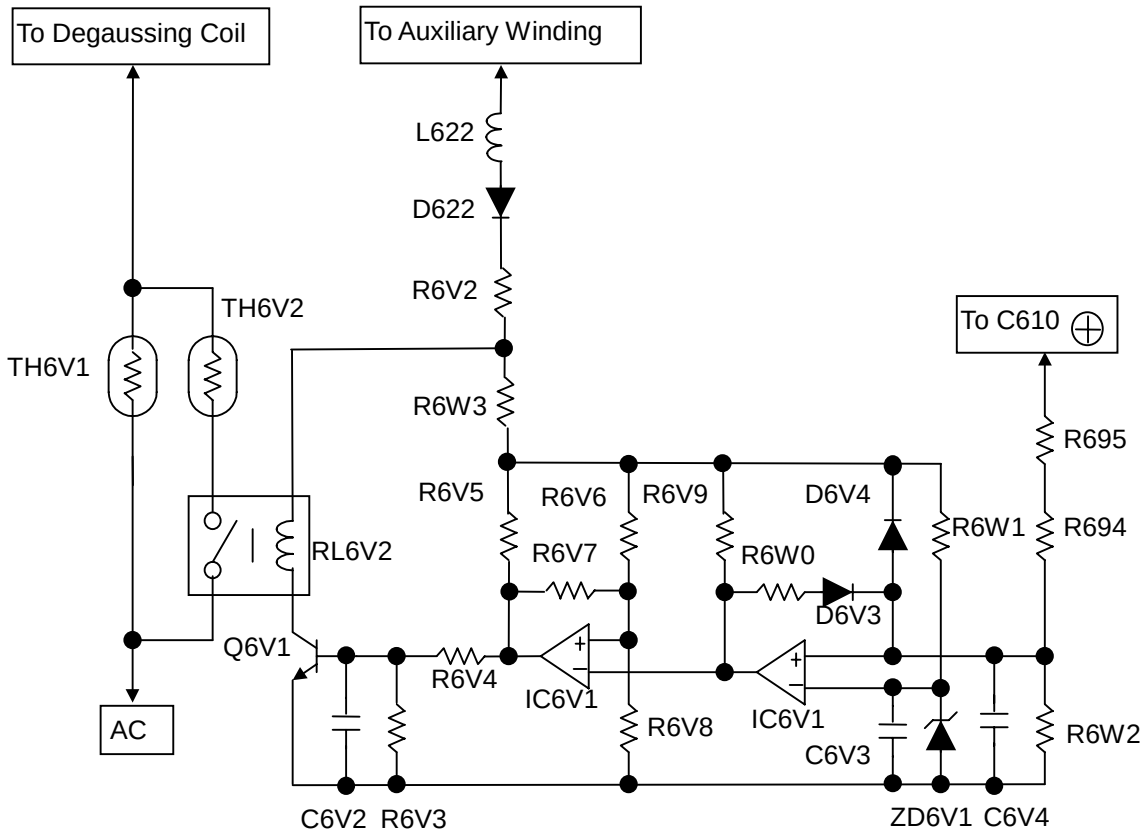
When the power switch turns on, or when user accesses the OSM degauss control, the current flows from CN-PM pin 3 to the base of Q682. Then Q682 and RL6V1 turn on for 3 seconds.



(Fig.8-7) Degaussing Circuit

8-8. Posistor's Automatic Selective Circuit

When the power switch is turn on, the voltage of C610 is detected by IC6V1.
If AC input voltage is less than AC 150V, IC6V1 output is high.
This will cause Q6V1 and RL6V2 to turn on.
Then the posistor TH6V2 is connected in parallel with TH6V1.
If AC input voltage is more than AC 150V, IC6V1 output is low. This will cause Q6V1 to turn off, and the posistor TH6V2 is not connected.



(Fig.8-8) Posistor's Automatic Selective Circuit

8-9. Over Current Protection

If some failure occurs and the total power of secondary outputs increase, the peak voltage of IC621 pin6 increases proportionally.

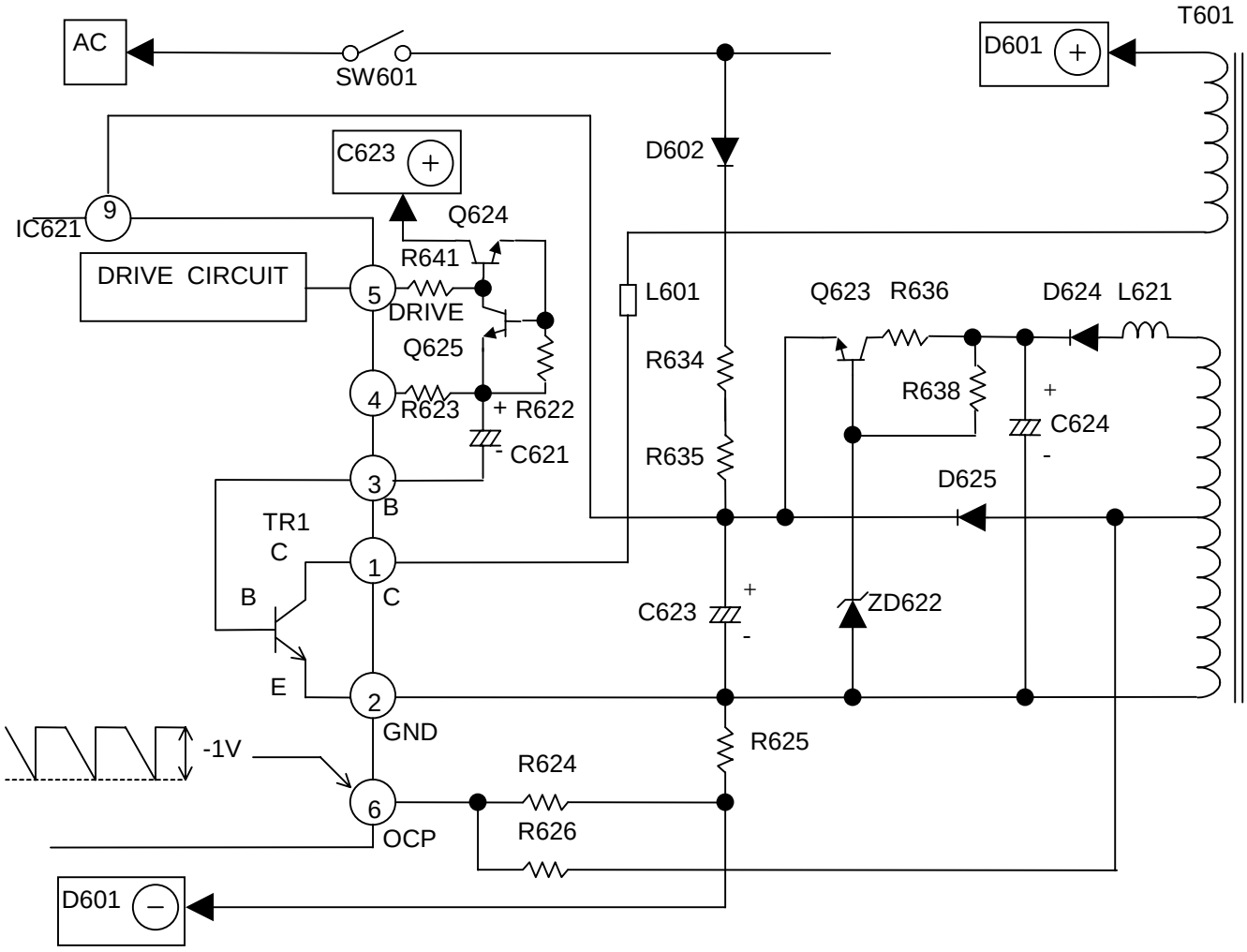
And when the peak voltage of IC621 pin 6 reaches -1V, IC621 decreases ON period duty cycle of TR1 (internal IC621).

And also the voltage of secondary outputs and the voltage of auxiliary winding of T601 decrease.

When the auxiliary winding T601 decreases below 5V, IC621 operation stop.

But the charging current flows into the capacitor C623 through R634, R635 and IC621 operation start when the voltage of IC621 pin 9 reaches 8V by this action.

So IC621 repeats the intermittent oscillation.



(Fig.8-9) Over Current Protection

8-10. Power Management System Circuit

When the horizontal and vertical Sync. are missing, the voltage of CN-PM pin 2 becomes low level and Q673 turn off and Q672 turn on.

As current flows via R673, R675 and D673 into a PC621 when Q672 turns on, each output voltage starts lowering and becomes stable. When the voltage of C671 “+” terminal (about +80V at normal output voltage), reduced to about +11V in this event.

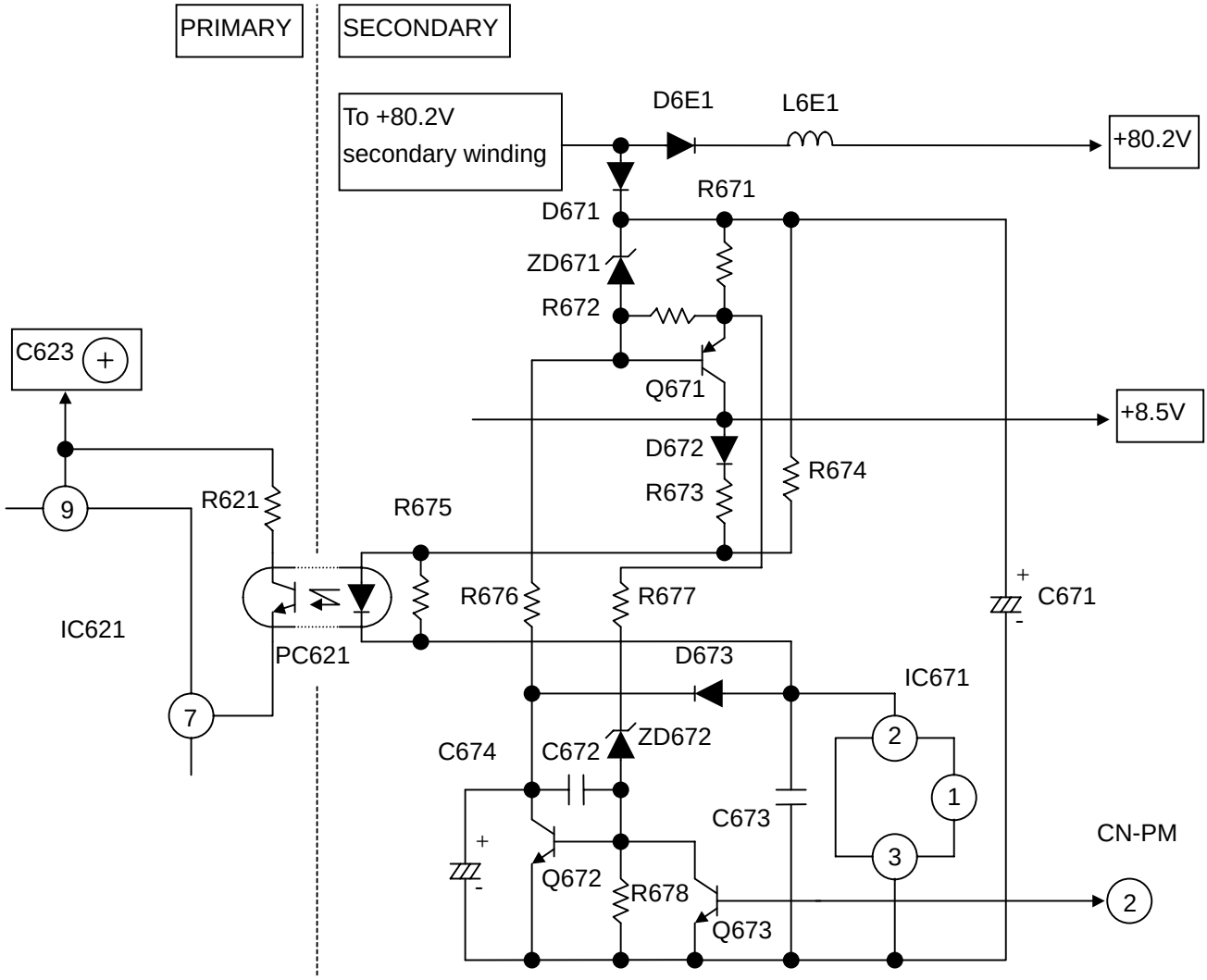
The stable power source for IC801 can be established by supplying C671 “+” terminal through R671 and Q671 while Q672 in on.

This is “SUSPEND STATE” and “OFF STATE” condition.

When the horizontal and vertical Sync applies again, the voltage of CN-PM pin 2 becomes high and Q673 turns on and Q672 turns off.

At this time, each output voltage rise and becomes stable at the normal output voltage.

And “ON STATE” is achieved.



(Fig.8-10) Power Management System Circuit

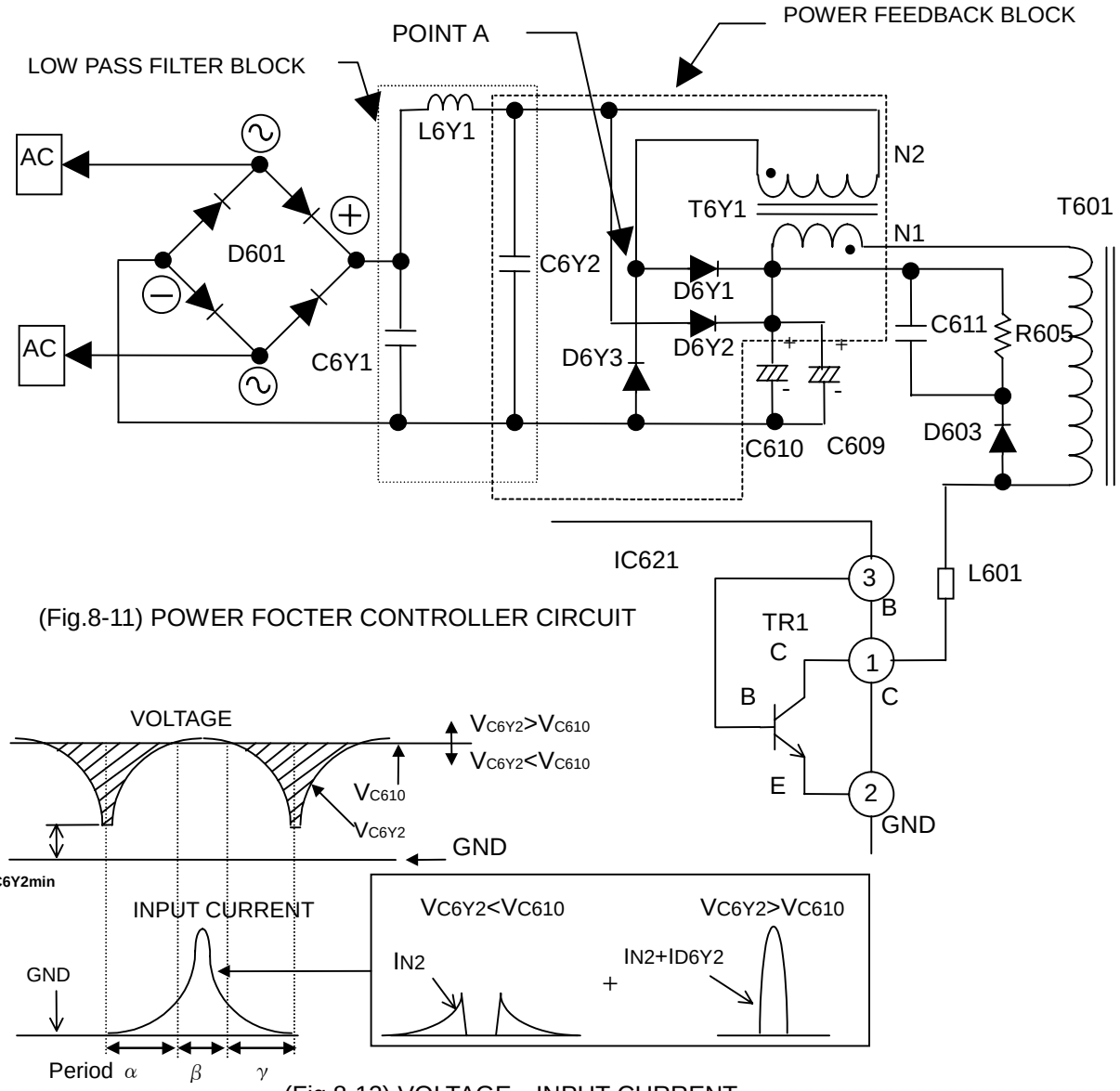
8-11. Power Factor Controller Circuit

This circuit is composed of Low pass filter block and Power feedback block. AC input is rectified by D601, then it charge C6Y2, C610 and C609.

C610 is not charged during period α and period γ from input voltage directly, because the voltage of C6Y2 is smaller than the voltage of C610. Then, C610 is charged during period α and period γ by Power feedback block. When TR1 (internal IC621) turn on, the N1 winding of T6Y1 is charged with energy. When TR1(internal IC621) turn off, the N2 winding of T6Y1 discharge energy. So, the voltage of point A is the part of slant line(Fig.8-12 : VC610-VC6Y2).And C610 is charged with feedback energy during period α and period γ, because the voltage of point A is bigger than the voltage of C610.

C610 is charged during period β (Fig.8-12) from input voltage directly.(Power supply which doesn't have “Power Factor Controller Circuit” is only charged during this period.)

Finally, the voltage of C610 and input current become Wave of Fig.8-12.The harmonic current is decrease, and Power Factor is improved. Because C610 is charged not only period β but also many parts of 1 cycle.

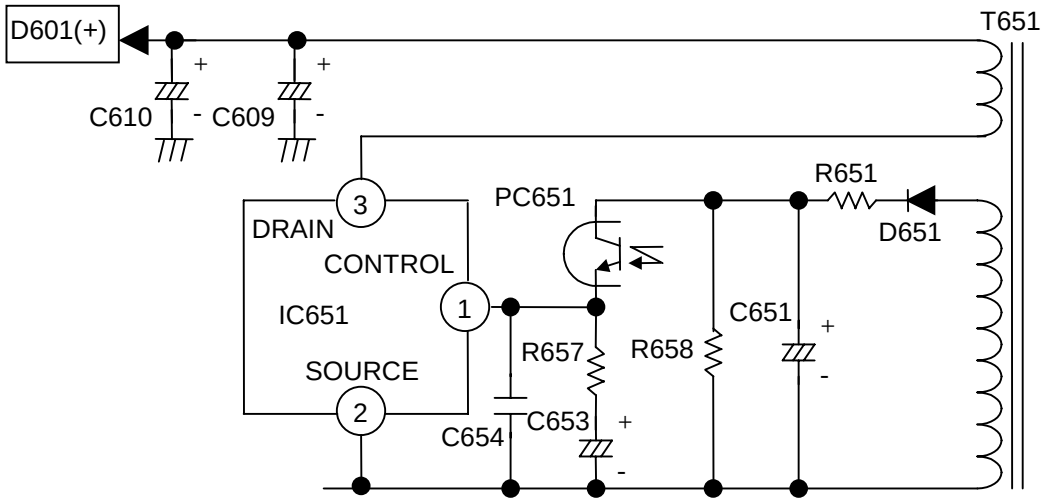


(Fig.8-11) POWER FOCTER CONTROLLER CIRCUIT

(Fig.8-12) VOLTAGE・INPUT CURRENT

8-12. Second Auxiliary Power Supply Circuit

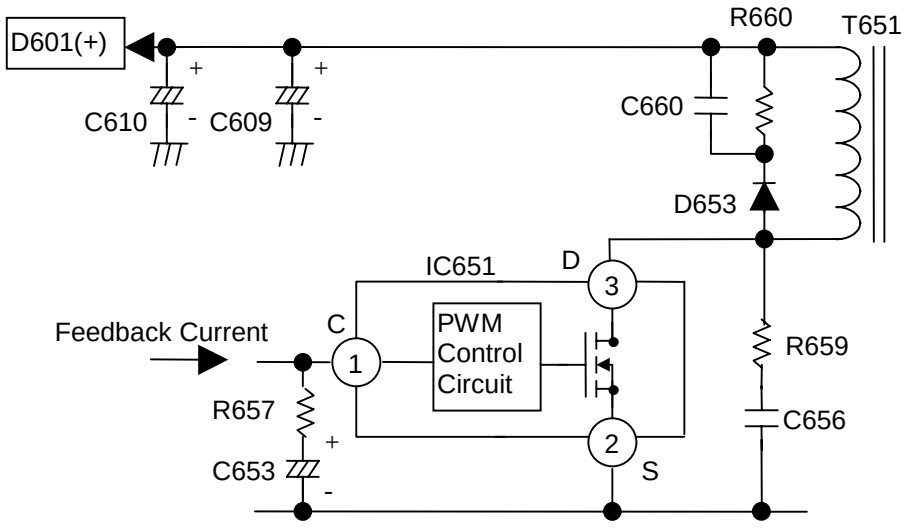
The second auxiliary power supply circuit need to activate IC651. When the power switch is turn on, the current flows into IC651 pin3.
And the current which flowed out from IC651 pin1 charges C653.
Oscillation starts when the voltage of IC651 pin 1 reaches about 6V by this action.
After start of oscillation, the fly-back voltage of the auxiliary winding of T651 is rectified and smoothed by D651,R651 and C651.
The resulting DC voltage is supplied to IC651 pin 1.(Then current frows in into IC651 pin 1.)



(Fig.8-13) Second Auxiliary Power Supply Circuit

8-13. Second Converter Circuit

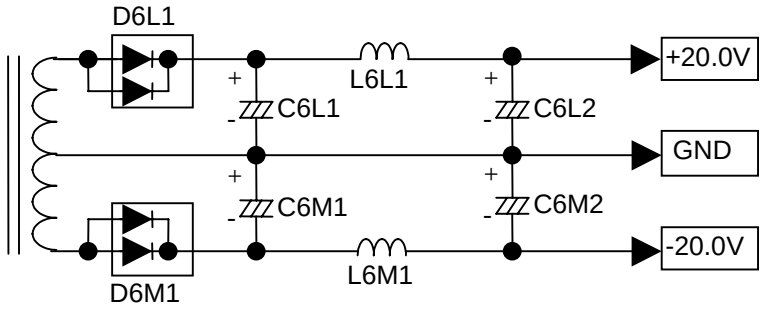
The second converter circuit consists of the primary winding of T651,
a switching device MOSFET(internal IC651) and surge absorbers (C656,C660,R659,R660 and D653) which are connected to the primary winding of T651.The feedback current to control “ON Duty” flows in into IC651 pin 1. so that the collector-emitter is turned ON and OFF.
IC651 pin 1 is also used as the connection to provide internal bias current.



(Fig.8-14) Second Conveter Circuit

8-14. Second Output Rectifying and Smoothing Circuit

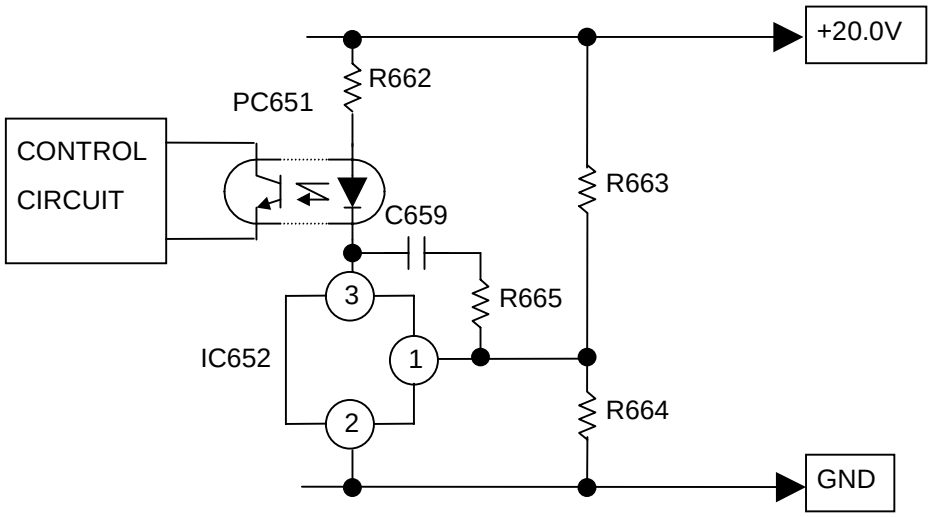
The fly-back voltages which are generated at the secondary windings of T651 are rectified by D6L1 and D6M1. Then, these voltages are smoothed by C6L1, C6L2, C6M1 and C6M2 so that DC voltages are obtained.
The DC voltages are maintained constantly by controlling the ON period duty cycle of MOSFET(internal IC651) in the second converter circuit.



(Fig.8-15) Second Output Rectifying and smoothing Circuit

8-15. Second Error Detection Amplifier Circuit

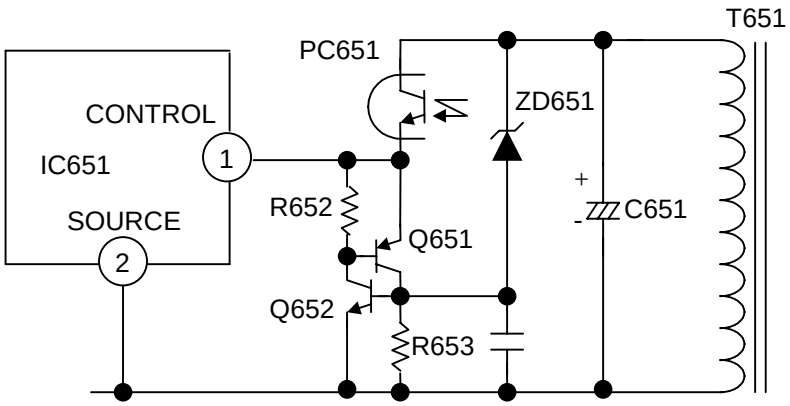
The output voltage +20.0V is compared with the reference voltage at the error amplifier IC652.
An error signal is applied to the control circuit via the photocupler PC651.



(Fig.8-16) Second Error Detection Amplifier Circuit

8-16. Second Over Voltage Protection

If some failure occurs and the output voltage of the secondary windings of T651 increase, the voltage of the auxiliary winding of T651 also increase proportionally. When the voltage of C651 increase about +13V. This action will stop the oscillator with in IC651.



(Fig.8-17) Second Over Voltage Protection

8-17. Second Over Current Protection

If some failure occurs and the total power of secondary outputs increase, the peak current of IC651 pin3 increases.

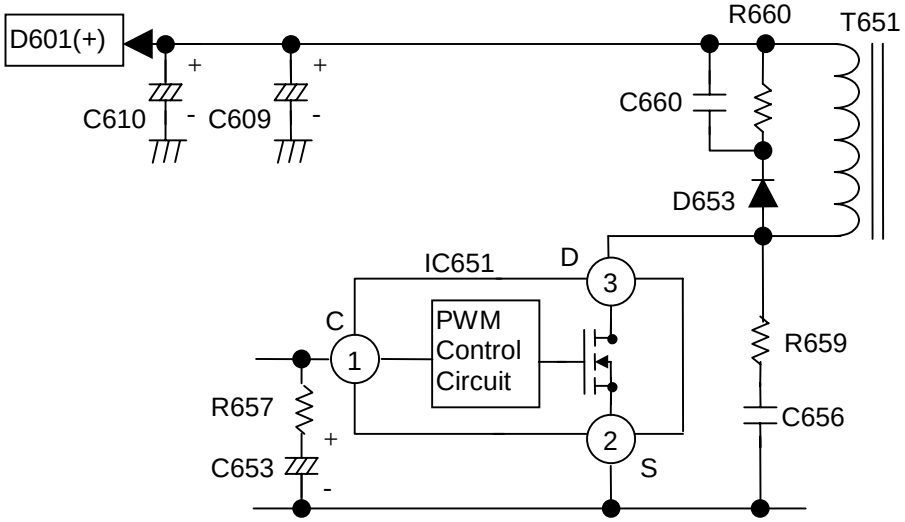
And when the peak current of IC651 pin3 reaches about 1.5A,the voltage of IC651 pin 1 decrease.

When the the voltage of IC651 pin 1 decreases below 4.7V, IC651 operation stop.

Next,the charging current flows into C653 and the voltage of IC651 pin 1 increase about 5.7V.

IC651 continues the movement of decreasing and increasing voltages 8 times.

After IC651 repeats the intermittent oscillation.



(Fig.8-18) Second Over Current Protection

8-18. Second Power Management System Circuit

When the horizontal and vertical Sync. are missing, power supply circuit to operate with IC621 becomes “SUSPEND STATE” or “OFF STATE” condition.(Refer to item 8-10.)

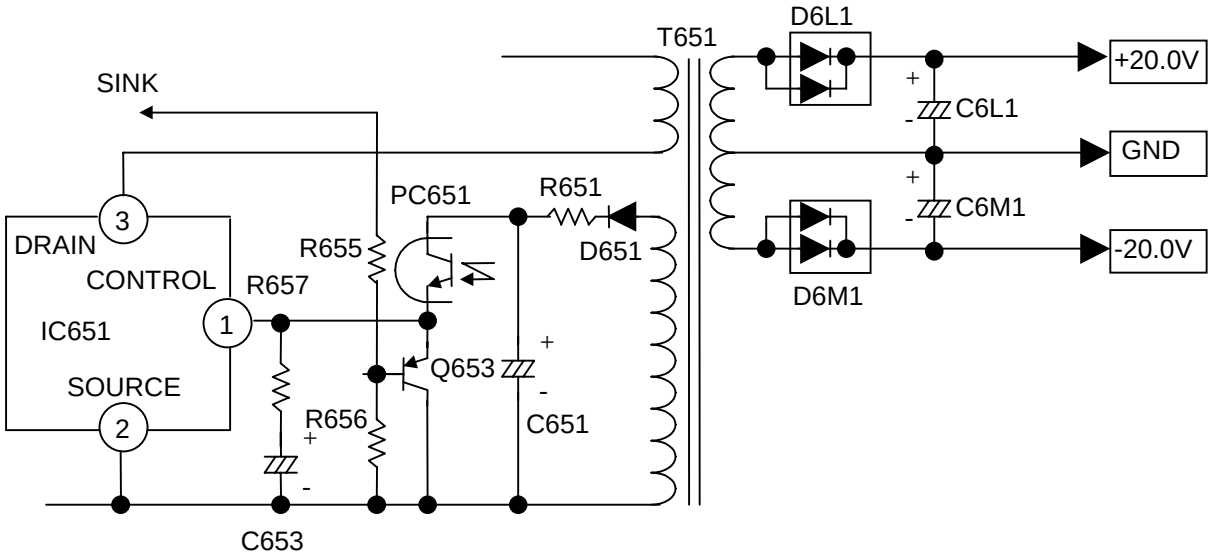
Then,the voltage of “SINK” becomes low level and Q653 turn on.

The voltage of IC651 pin1 decreases low level and IC651 operation stop.

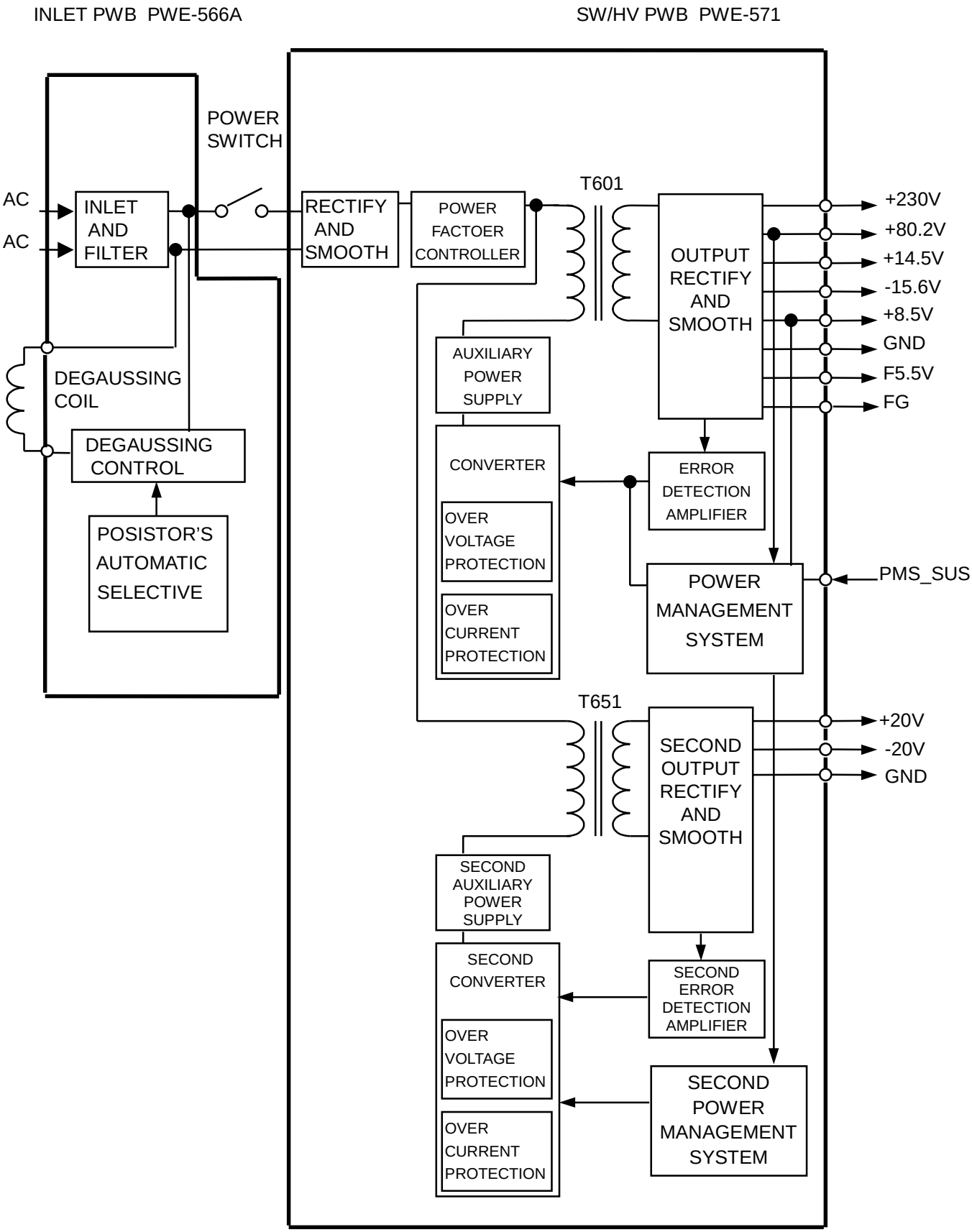
(Output +20V and -20V fall.)

When the horizontal and vertical Sync applies again, power supply circuit to operate with IC621 becomes “ON STATE”. And the voltage of “SINK” becomes high level and Q653 turn off.

At this time, IC651 operation start and output +20V and -20V rise.



(Fig.8-19) Power Management System Circuit


INLET PWB PWE-566A
SW/HV PWB PWE-571
POWER SWITCH
AC
AC
INLET AND FILTER
RECTIFY AND SMOOTH
POWER FACTOER CONTROLLER
T601
OUTPUT RECTIFY AND SMOOTH
+230V
+80.2V
+14.5V
-15.6V
+8.5V
GND
F5.5V
FG
AUXILIARY POWER SUPPLY
DEGAUSSING COIL
DEGAUSSING CONTROL
POSISTOR'S AUTOMATIC SELECTIVE
CONVERTER
OVER VOLTAGE PROTECTION
OVER CURRENT PROTECTION
ERROR DETECTION AMPLIFIER
POWER MANAGEMENT SYSTEM
PMS_SUS
T651
SECOND OUTPUT RECTIFY AND SMOOTH
+20V
-20V
GND
SECOND AUXILIARY POWER SUPPLY
SECOND CONVERTER
OVER VOLTAGE PROTECTION
OVER CURRENT PROTECTION
SECOND ERROR DETECTION AMPLIFIER
SECOND POWER MANAGEMENT SYSTEM

9. DYNAMIC CONVERGENCE CORRECTION CIRCUIT

The dynamic convergence correction circuit consists of the digital convergence circuit(IC8U1 and IC8U2) and the DSP convergence correction circuit(IC501) and the output circuit(IC8P2, and IC8P1).

1) Digital Convergence Circuit

The digital convergence circuit make three correction signals(4H and 4V).

4H :R-B(X) convergence can be adjusted.

4V :R-B(Y) convergence can be adjusted.

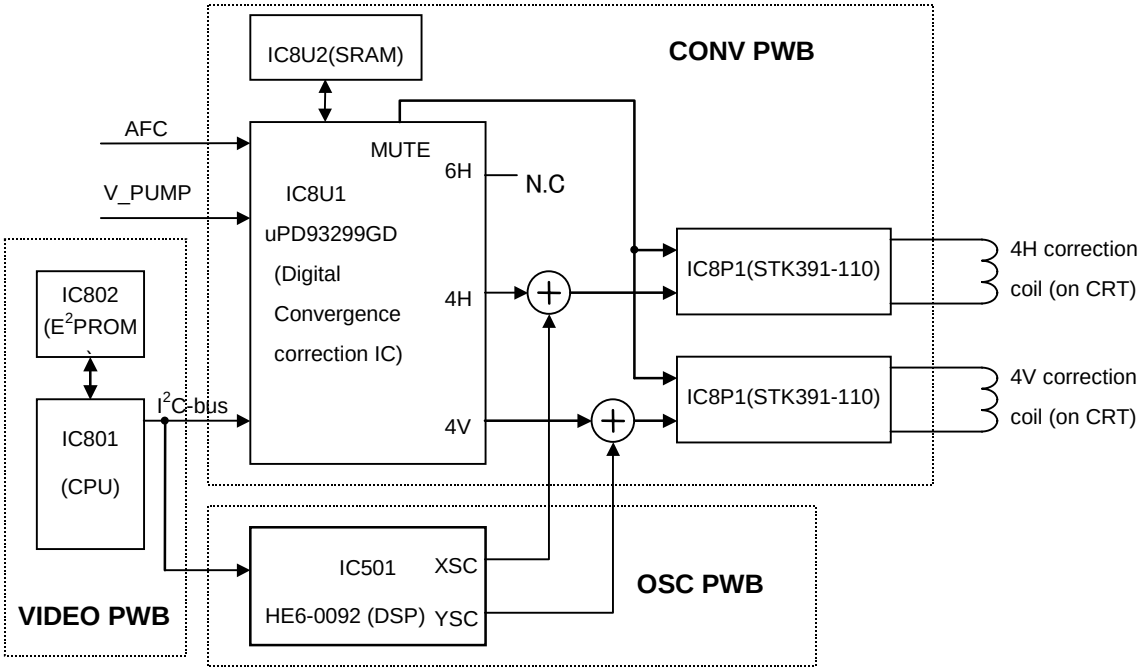
These signals can change individually at 165 blocks(ROW:1-11,COLUMN:1-15) on the picture.

When the power turn on, the convergence correction data which is held at IC802 is sent to IC8U2 through IC801 and IC8U1, then the data is output from IC8U1. The timing of the output data corresponds with AFC and V_PUMP timing. The output data is converted to analog signals by R-2R ladder resistance (MR8U1 and MR8U2). The MUTE signal which stop convergence correction current is output from IC8U1 at pin 95. This signal work during the degauss is proceeded.

2) DSP Convergence Correction Circuit

The DSP convergence circuit make two correction signals (XSC and YSC).

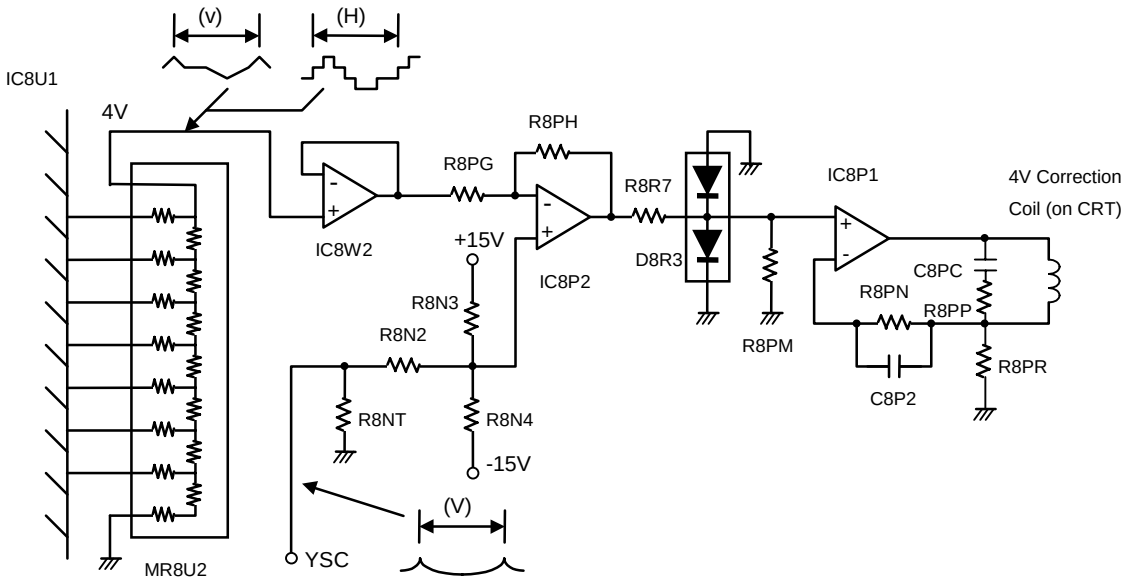
These signals are composed of DC, vertical saw wave and vertical parabolic wave. The fig.9.3 show the relationship between the waveform and picture image.



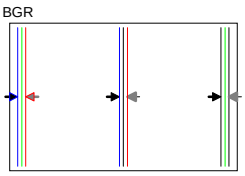
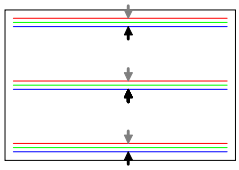
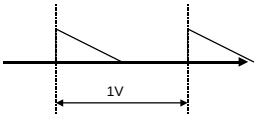
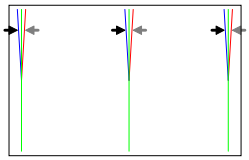
(Fig. 9.1) Dynamic Convergence Correction Circuit

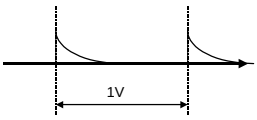
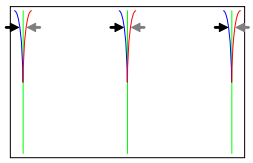
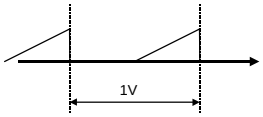
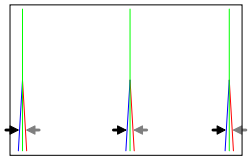
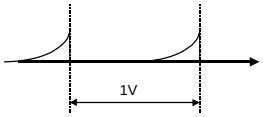
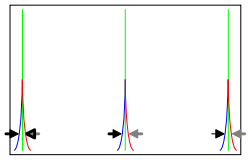
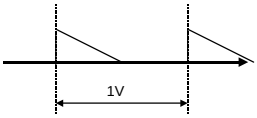
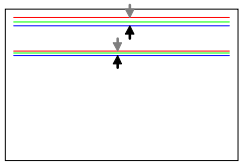
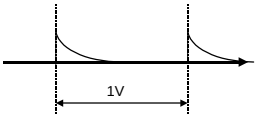
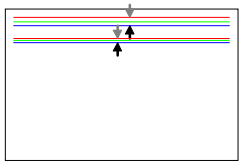
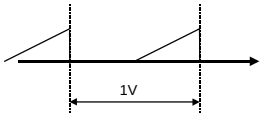
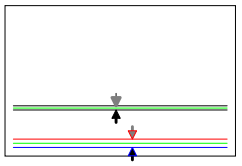
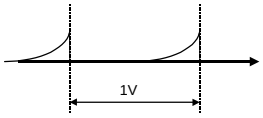
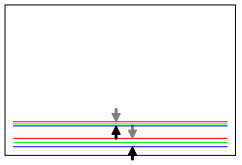
3) Output Circuit

The output circuit make two convergence correction currents flowing 4H and 4V coils which are constructed on the deflection yoke. These output circuits are similar to the other. The following description is 4V output circuit. The digital signals which are output from IC8U1 are converted to the analog signal(4V) at MR8U2 and input to IC8P2 through IC8W2.The signal(YSC) which is output from DSP(IC501) is changed DC level and swing at R8N2,R8N3 and R8N4 and then input to IC8P2.These signal(4V and YSC) are mixed at IC8P2 and input to IC8P1.R8R7 and D8R3 are slice circuit for preventing over current and keep the input voltage at IC8P1 within -0.7V to +0.7V. At IC8N1 the input voltage is converted to the current flowing correction coil on CRT.



(Fig. 9.2) Convergence Output Circuit (Ex. 4V)

	SERVICE MENU	USER MENU	WAVE FORM	PICTURE IMAGE
1	H.S.CONVER	HORIZONTAL	DC	
2	V.S.CONVER	VERICAL	DC	
3	H.CONVER SAW T	TOP HORIZONTAL		

4	H.CONVER PARA T	-		
5	H.CONVER SAW B	BOTTOM HORIZONTAL		
6	H.CONVER PARA B	-		
7	V.CONVER SAW T	TOP VERTICAL		
8	V.CONVER PARA T	-		
9	V.CONVER SAW B	BOTTOM VERTICAL		
10	V.CONVER PARA B	-		

(Fig. 9.3) Convergence Waveform And picture image

10. AUTO and MANUAL PURITY CORRECTION (GLOBALSYNC) CIRCUIT

1) SENSOR PART

FP1370 has three sensors to correct poor purity.

A) SENSOR OF EARTH MAGNETIC FIELD CIRCUIT

B) SENSOR OF TEMPERATURE CIRCUIT

C) SENSOR OF CRT BEAM CURRENT CIRCUIT

1-A) SENSOR OF EARTH MAGNETIC FIELD CIRCUIT

EARTH MAGNETIC FIELD CORRECTION CIRCUIT compensates automatically for purity problem of the EAST,WEST,NORTH and SOUTH magnetic field.

Magnetic sensor (IC4H1) is used in this circuit.

When the magnetic field change, the voltage of IC4H1 pin5 (CNPU pin3), IC4H1 pin6(CNPU pin2) varies.

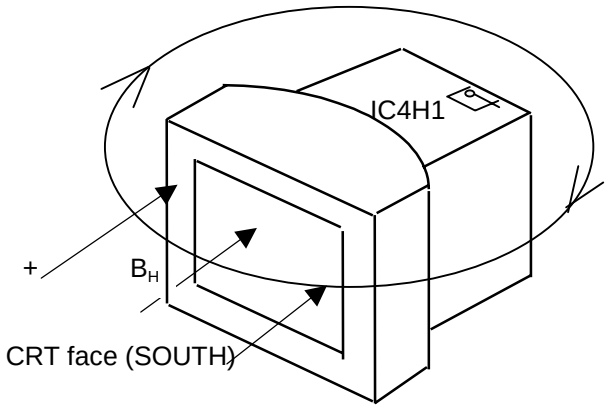
CNPU pin3 voltage is fed to the A/D converter in IC801 (pin48).

CNPU pin2 voltage is fed to the A/D converter in IC801 (pin47).

And the reference voltage (2.5V) of Magnetic sensor (IC4H1 pin7) is fed IC801 (pin49) too.

CRT face Direction (Horizontal magnetic field B_H:30uT)	IC4H1 pin5 Voltage-IC4H1 pin7 Voltage	IC4H1 pin6 Voltage-IC4H1 pin7 Voltage
EAST	0V	-0.5V
WEST	0V	0.5V
SOUTH	-0.5V	0
NORTH	0.5V	0

(Fig.10.1) The example of Magnetic sensor (IC4H1) voltage

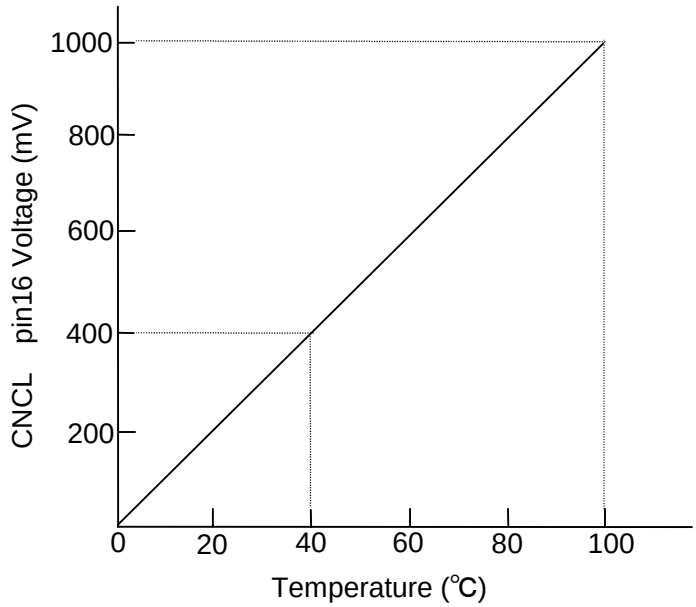


1-B) SENSOR OF TEMPERATURE CIRCUIT

Temperature Sensor (IC151) is used in this circuit.(on CONTROL PWB)

When the surrounding temperature of the unit change, the voltage of IC151 out put pin (CNCL 16pin on VIDEO PWB) varies.

This voltage is fed to the A/D converter in IC801 (pin50)

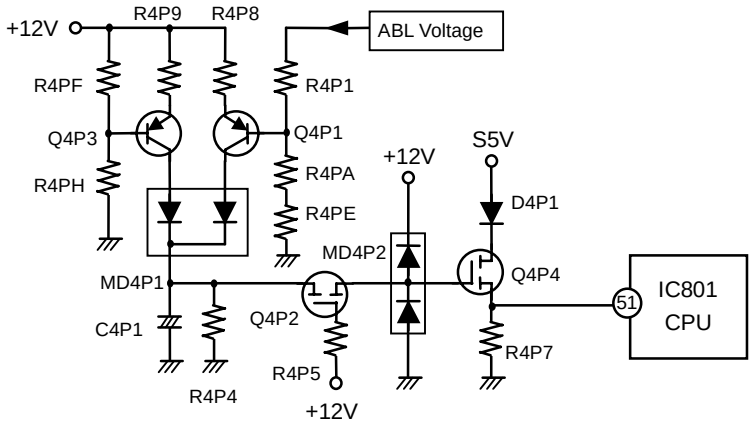


(Fig.10.2) The example of Temperature sensor (IC4H1) voltage

1-C) SENSOR OF CRT BEAM CURRENT CIRCUIT

Change of purity is caused by warm up after power on and changing of CRT beam current.

Correction voltage is generated by charging C4P1. This voltage can detect both warm up and changing of CRT beam current. Warm up is detected by C4P1 charging time, changing of CRT beam current is detected by changing of ABL voltage. Correction voltage is input to IC801 pin 51. IC801 calculates four corner purity correction. Q4P2 is switch in PMS and power off. Q4P4 is buffer of correction voltage.



(Fig.10.3) Sensor of CRT beam current circuit

2) PURITY CORRECTION PART

2-A) NORTH/SOUTH purity correction

MPU controls output voltage by comparing the sensor voltage (IC801 pin48) with the reference voltage (IC801 pin49) and GLOBALSYNC OSD.

The D/A converter (IC532 pin16) output center voltage is 2.5V and variable range is between 0V and +5V.

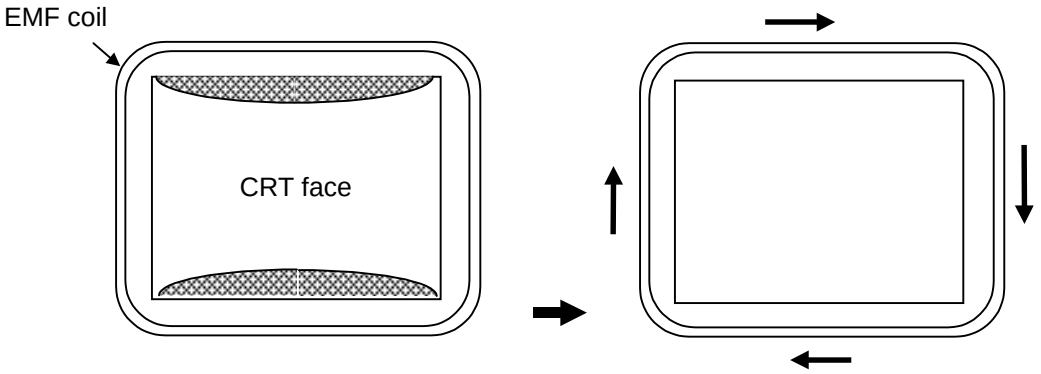
The DC output current flows in the EMF (Earth Magnetic Field) coil.

This current flows to the feedback resistor (R4J6) of IC4J1.

This current is detected as voltage at the feedback resistor.

NOTE) : During DEGAUSS, becomes Low level(D/A converter output voltage is 2.5V), therefore the current doesn't flow in the EMF coil.

And it prevents magnetization in the CRT.



(The example of image: Correction of NORTH/SOUTH purity)

2-B) Four corner purity correction.

MPU controls output voltage by comparing 4 input voltages(IC801 pin47,pin49,pin50,pin51) and GLOBALSYNC (TOP LEFT, TOP RIGHT, BOTTOM LEFT, BOTTOM RIGHT) OSD.

The D/A converter IC532 (pin14:TOP LEFT, pin8:TOP RIGHT, pin9:BOTTOM LEFT, pin7:BOTTOM RIGHT) output center voltage is 2.5V and variable range is between 0V and +5V.

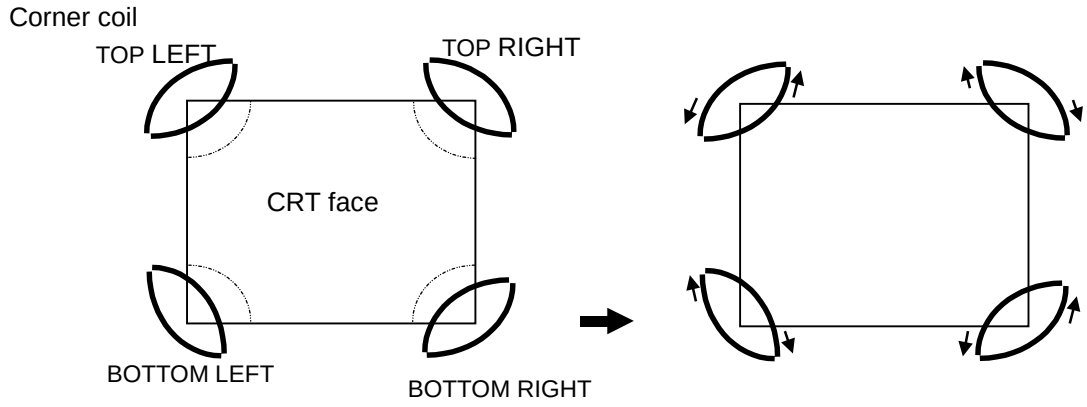
The DC output current flows in the corner coil(four corner).

This current flows to the feedback resistor(R4N6,R4R6,R4L6,R4M6) of output circuit.

This current is detected as voltage at the feedback resistor.

NOTE) :During DEGAUSS, becomes Low level(D/A converter output voltage is 2.5V), therefore the current doesn't flow in the corner coil.

And it prevents magnetization in the CRT.



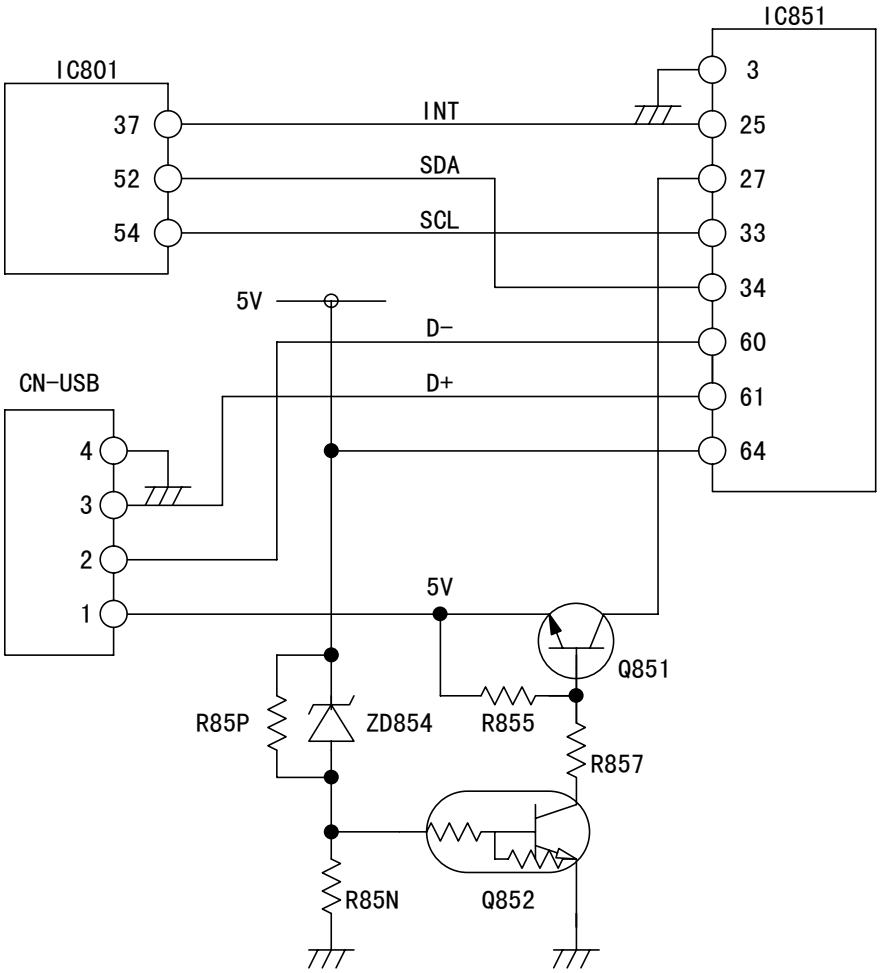
(The example of image: Correction of four corner purity)

11. USB CIRCUIT

IC801 (MAIN MPU) uses as the I2 C-Bus master, and IC851 (USB MPU) uses as the I2 C-Bus slave.
At the time of power on of the monitor, IC801 forwards the present value and the necessary early period data to IC851 through I^2C-Bus (SCL, SDA).
In the case that CN-USB and PC (USB HOST) are connecting with USB cable, the 5V from PC is input to IC851 pin27 through Q851, Q852.
Then according to IC851 forwards these data to PC through D+/D-, the monitor is recognized as the human interface device.
And, in the case that CN-USB and PC are connected with USB cable in the condition of power off of the monitor, the monitor is not recognized as a/the human interface device, because IC851 pin27 becomes low by Q851, Q852.

In the case that the monitor is adjusted with USB ,the WINDOWS application called APPLET is used.

For example, when we do the adjustment of H.SIZE by using APPLET, the command that makes H. SIZE a certain value is forwarded from PC to IC851 through D+/D-.
At this time, IC851 forwards 1 pulse to the INT line, because it needs to forward the command to IC801.
By this IC801 reads out the command from IC851 through I2 C-Bus, because it recognizes that the command from PC is forwarded to IC851.
IC801 controls DAC by the command as OSM control.



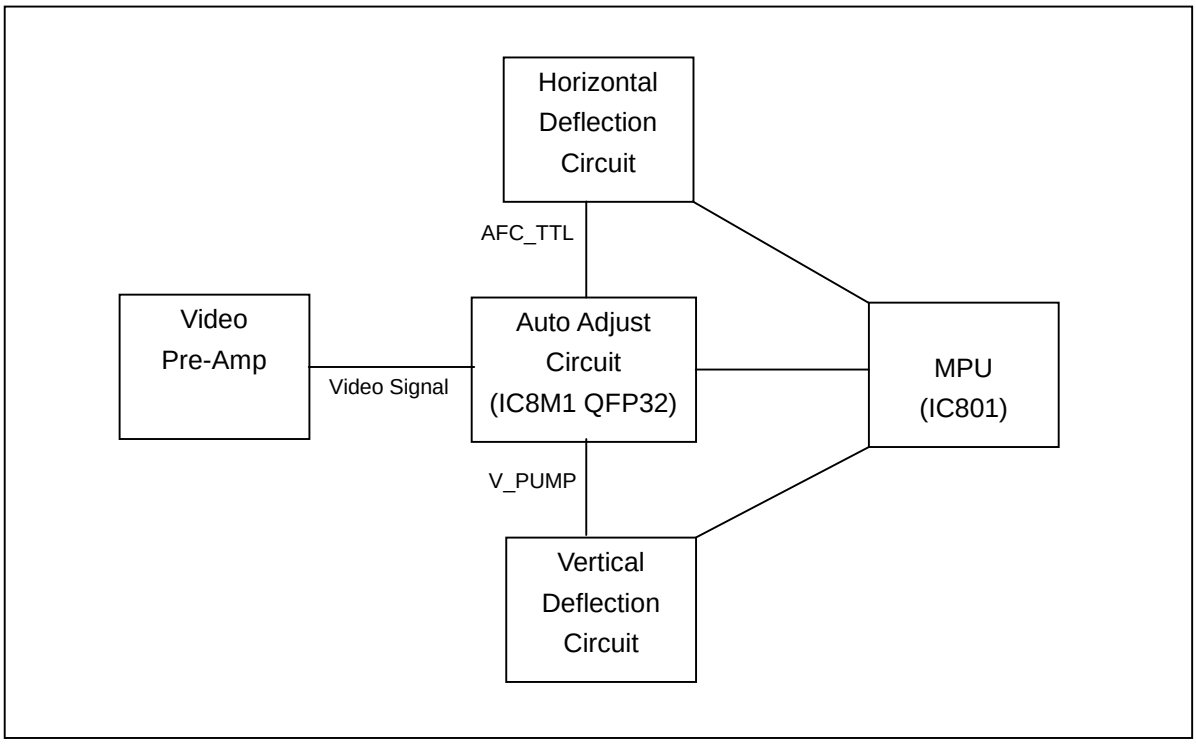
(Fig.11.1) USB Circuit

12. AUTO ADJUST CIRCUIT

By detecting video signal, AutoAdjust function adjusts size and position. MPU has several standards of frequency, active ratio and so on. MPU compares measurement data and with their standards, and calculates adaptive size and position data and sets them.
IC8M1 is video detecting IC. It measures following data.
H.trace.time, H.disp.time, H.front.porch, H.back.porch
V.total.time, V.disp.time, V.front.porch, V, back.porch
That means AutoAdjust function can't work correctly in the cases as follows.

a. No signal (ex. All black)
b. Too narrow active ratio (ex. 1/3 window)
c. Animation (ex. movie, game)
d. Too dark

If Animation, sometimes AutoAdjust function can detect video signal and sometimes can't. As a result AutoAdjust function can't work stably.
A blinking picture is worst case.



(Fig.12.1) Auto Adjust Circuit Block Diagram

REPLACEMENT PARTS LIST

The components specified for Model FP1370(A)

SYMBOL	PART NO	DESCRIPTION
*** CRT & TUNER ***		
CRT	33022503	CRT M51LRY22X61
*** ICS ***		
IC151	370EF040	IC LM45CIM3X
IC401	37006027	IC LA7876N
IC421	370E6178	IC BA14741F-E2
IC471	37005256	IC UPC7812AHF (REG)
IC481	370KE062	IC BA033FP-E2
IC4H3	37056616	IC BA10358
IC4J1	370AA092	IC BA4558F-E2(OP-AMP)
IC4L1	370AA067	IC BA10324AF-E2 (OP-AMP)
IC501	37R56288	MOS HE6-0092(JANGLE61882)
IC510	370E6178	IC BA14741F-E2
IC511	370E6178	IC BA14741F-E2
IC513	370EB067	IC UPC814G2-E2(OP-AMP)
IC532	370EF032	MOS M62392FP-D
IC571	37REH024	MOS M62320FP-D-T2
IC591	370AA067	IC BA10324AF-E2 (OP-AMP)
IC592	37076409	IC BA9757
IC5A1	370AA092	IC BA4558F-E2(OP-AMP)
IC5GA	370EF021	IC CA0007AM-T
IC5W1	370KJ003	IC BA9762F
IC621	37076406	IC STR-S6729A(LF953)
IC651	37005345	IC MIP0224SY
IC652	370A1009	IC UPC1093J-T (REG)
IC671	37076357	IC SE080N(LF12)
IC6V1	37011351	IC KIA393P (COMP)
IC711	37011401	IC M52742ASP
IC721	37011380	IC VPS16
IC731	37RAA021	IC M52755FP-D
IC742	370AA067	IC BA10324AF-E2 (OP-AMP)
IC751	370EF031	MOS M62393FP-D
IC791	37R56305	MOS M35070-050FP
IC7A1	370EF025	IC M52347FP
IC7F1	37076408	IC SI-3062FA
IC7G1	370EC058	MOS HD74HC123AFP-EL
IC801	37R56377	MOS UPD78018FYGC-R23-AB8
IC802	370EE004	MOS M24C16-MN6 T
IC851	37R56326	MOS LSC528223FU
IC854	370A1009	IC UPC1093J-T (REG)
IC8A1	370ED003	MOS 24LCS21AT/SN

SYMBOL	PART NO	DESCRIPTION
IC8G1	37005277	IC PQ05RR13 (REG)
IC8G2	37005349	IC PQ05RD08(REG)
IC8M1	37076420	MOS BU6483K(V_DETECT)
IC8M2	370KE062	IC BA033FP-E2
IC8P1	37011403	IC STK391-110
IC8P2	370EB067	IC UPC814G2-E2(OP-AMP)
IC8T1	370K5005	IC UPC78L15J-T
IC8T2	370K5006	IC UPC79L15J-T
IC8U1	37R56294	MOS UPD93299GD(D-CONV)
IC8U2	370E3438	MOS CY7C199-15VCT
IC8W2	370EB067	IC UPC814G2-E2(OP-AMP)

*** TRANSISTORS ***

CR601	35599006	TRIAC TM1061S-L
MQ571	35135002	TR SLA5070(FET ARRAY)
Q101	35AB0313	TR 2SA1037AK-T146 R
Q102	35AB0313	TR 2SA1037AK-T146 R
Q103	35EB0238	TR DTC114YKA-T146
Q104	35EB0238	TR DTC114YKA-T146
Q411	35KB2498	TR 2SK3018-T106
Q421	35KB2498	TR 2SK3018-T106
Q422	35KB2498	TR 2SK3018-T106
Q423	35KB2498	TR 2SK3018-T106
Q4J1	350J5602	TR 2SD1994A(TA)
Q4J2	350C2022	TR 2SB1322A(TA)
Q4K1	350J5602	TR 2SD1994A(TA)
Q4K2	350C2022	TR 2SB1322A(TA)
Q4L1	350J5602	TR 2SD1994A(TA)
Q4L2	350C2022	TR 2SB1322A(TA)
Q4M1	350J5602	TR 2SD1994A(TA)
Q4M2	350C2022	TR 2SB1322A(TA)
Q4N1	350J5602	TR 2SD1994A(TA)
Q4N2	350C2022	TR 2SB1322A(TA)
Q4P1	35AB0313	TR 2SA1037AK-T146 R
Q4P2	35KB2498	TR 2SK3018-T106
Q4P3	35AB0313	TR 2SA1037AK-T146 R
Q4P4	35KB2505	TR 2SK1103-Q(TX)
Q4R1	350J5602	TR 2SD1994A(TA)
Q4R2	350C2022	TR 2SB1322A(TA)
Q501	35CB1113	TR 2SC2412K-T146 R
Q502	35KB2498	TR 2SK3018-T106
Q503	35AB0313	TR 2SA1037AK-T146 R
Q504	35CB1113	TR 2SC2412K-T146 R
Q505	35CB1113	TR 2SC2412K-T146 R
Q553	35CB1113	TR 2SC2412K-T146 R
Q554	35AB0313	TR 2SA1037AK-T146 R
Q555	35128023	TR IRLS530A
Q561	35095411	TR 2SC5453

SYMBOL	PART NO	DESCRIPTION
Q571	35072612	TR 2SD2396 J
Q572	35128000	TR 2SK2522-01M
Q581	35072612	TR 2SD2396 J
Q5A1	35072720	TR 2SD1889
Q5E1	35CB1113	TR 2SC2412K-T146 R
Q5F1	35AB1596	TR 2SA1514K S-T
Q5F2	35EB0212	TR DTA114WKA-T146
Q5F3	35CB1113	TR 2SC2412K-T146 R
Q5F4	35EB0212	TR DTA114WKA-T146
Q5G1	35128034	TR 2SJ569LS
Q5R1	35128009	TR 2SK2645-01MR(F111)
Q5W1	35CB1113	TR 2SC2412K-T146 R
Q5W2	35AB0313	TR 2SA1037AK-T146 R
Q5X1	350K4112	TR 2SA916-T L
Q5X2	350K4112	TR 2SA916-T L
Q621	350E3218	TR 2SC1740S-T R
Q622	350J4817	TR 2SC1473A-TA Q
Q623	35095270	TR 2SC2317
Q624	35092400	TR 2SC3852A
Q625	35092400	TR 2SC3852A
Q651	35AB0011	TR 2SA812-T1B M5
Q652	35CB0012	TR 2SC1623-T1B L6
Q653	35AB0011	TR 2SA812-T1B M5
Q671	35030000	TR 2SB1626
Q672	350J5382	TR 2SC3478A-T K
Q673	35EB0230	TR DTC114EKA-T146
Q682	35CB0012	TR 2SC1623-T1B L6
Q6P1	350E3218	TR 2SC1740S-T R
Q6V1	350E3218	TR 2SC1740S-T R
Q711B	350H0200	TR 2SC2407A-T
Q711G	350H0200	TR 2SC2407A-T
Q711R	350H0200	TR 2SC2407A-T
Q721B	35KB2498	TR 2SK3018-T106
Q721G	35KB2498	TR 2SK3018-T106
Q721R	35KB2498	TR 2SK3018-T106
Q722B	35KB2498	TR 2SK3018-T106
Q722G	35KB2498	TR 2SK3018-T106
Q722R	35KB2498	TR 2SK3018-T106
Q723B	35KB2498	TR 2SK3018-T106
Q723G	35KB2498	TR 2SK3018-T106
Q723R	35KB2498	TR 2SK3018-T106
Q732	35AB0313	TR 2SA1037AK-T146 R
Q734	35EB0230	TR DTC114EKA-T146
Q735	35EB0230	TR DTC114EKA-T146
Q741B	350J5205	TR 2SC3415S-TP
Q741G	350J5205	TR 2SC3415S-TP
Q741R	350J5205	TR 2SC3415S-TP
Q771	35AB0313	TR 2SA1037AK-T146 R

SYMBOL	PART NO	DESCRIPTION
Q772	35CB1113	TR 2SC2412K-T146 R
Q781	350J5205	TR 2SC3415S-TP
Q791	35CB2385	TR 2SC3735-T1B B34
Q792	35CB2385	TR 2SC3735-T1B B34
Q793	35CB1113	TR 2SC2412K-T146 R
Q794	35EB0232	TR DTC144EKA-T146(0°)
Q795	35CB1113	TR 2SC2412K-T146 R
Q796	35CB2385	TR 2SC3735-T1B B34
Q797	35EB0230	TR DTC114EKA-T146
Q798	35EB0230	TR DTC114EKA-T146
Q7A1	35EB0232	TR DTC144EKA-T146(0°)
Q7A2	35CB1113	TR 2SC2412K-T146 R
Q7E1	35CB2393	TR 2SC3757 R-TX
Q7E2	35CB1113	TR 2SC2412K-T146 R
Q7E3	35AB0313	TR 2SA1037AK-T146 R
Q7G1	35CB1113	TR 2SC2412K-T146 R
Q7G2	35CB1113	TR 2SC2412K-T146 R
Q7G3	35CB1113	TR 2SC2412K-T146 R
Q7G4	35CB1113	TR 2SC2412K-T146 R
Q7G5	35CB1113	TR 2SC2412K-T146 R
Q7G6	35CB1113	TR 2SC2412K-T146 R
Q7K1	350K4112	TR 2SA916-T L
Q7K2	35EB0232	TR DTC144EKA-T146(0°)
Q7K3	35CB1113	TR 2SC2412K-T146 R
Q7Y1	35AB1592	TR 2SA1434-TB
Q7Y2	35CB2468	TR 2SC3624-T1B-L18
Q7Y3	35AB1592	TR 2SA1434-TB
Q7Y4	35CB2468	TR 2SC3624-T1B-L18
Q7Y5	35AB1592	TR 2SA1434-TB
Q7Y6	35CB2468	TR 2SC3624-T1B-L18
Q7Y7	35AB1592	TR 2SA1434-TB
Q7Y8	35CB2468	TR 2SC3624-T1B-L18
Q831	35EB0230	TR DTC114EKA-T146
Q832	35EB0230	TR DTC114EKA-T146
Q833	35EB0230	TR DTC114EKA-T146
Q834	35EB0230	TR DTC114EKA-T146
Q851	35AB0313	TR 2SA1037AK-T146 R
Q852	35EB0232	TR DTC144EKA-T146(0°)
Q8A1	35CB1113	TR 2SC2412K-T146 R
Q8A2	35EB0232	TR DTC144EKA-T146(0°)
Q8A3	35CB1113	TR 2SC2412K-T146 R
Q8A4	35AB0313	TR 2SA1037AK-T146 R
Q8A5	35KB2498	TR 2SK3018-T106
Q8A6	35KB2498	TR 2SK3018-T106
Q8M1B	35CB2453	TR 2SC3772-3-TB
Q8M1G	35CB2453	TR 2SC3772-3-TB
Q8M1R	35CB2453	TR 2SC3772-3-TB
Q8R1	35CB0011	TR 2SC1623-T1B L5

SYMBOL	PART NO	DESCRIPTION
Q951	35CB1113	TR 2SC2412K-T146 R
Q981	35CB2491	TR 2SC3906K-E2
Q982	350J5241	TR 2SC2389S-TP R
Q983	350A2001	TR 2SA1038S-TP R
Q984	35072752	TR 2SD1763A E
Q985	35030012	TR 2SB1186A E
Q987	350J5262	TR 2SC4620 P-TV2

*** DIODES ***

D2001	361K7822	DIODE D1NL20,AT52
D2002	36CB0213	DIODE DAN212K-T146
D401	361K7778	DIODE PR1004G,AT52
D402	361K7778	DIODE PR1004G,AT52
D421	360K1025	DIODE 1SS133
D4H1	360K1025	DIODE 1SS133
D4H2	360K1025	DIODE 1SS133
D4P1	36CB0213	DIODE DAN212K-T146
D541	360K1025	DIODE 1SS133
D542	360K1025	DIODE 1SS133
D551	36107771	DIODE FE5DL-6596
D553	36107775	DIODE RX3Z(LF014-102)
D561	36107846	DIODE FMC-28UA
D562	36108250	DIODE FMQ-G5FS
D591	361K7778	DIODE PR1004G,AT52
D592	361K7778	DIODE PR1004G,AT52
D593	360K1025	DIODE 1SS133
D5A1	361K8252	DI RB721Q-40T72
D5A2	361K8252	DI RB721Q-40T72
D5E1	361K7777	DIODE 1SS244-T72
D5E2	361K7777	DIODE 1SS244-T72
D5E3	360K1025	DIODE 1SS133
D5G1	360K1025	DIODE 1SS133
D5G2	36107792	DIODE YG911S3R
D5G3	361K8252	DI RB721Q-40T72
D5G4	361K8252	DI RB721Q-40T72
D5R1	36107308	DIODE ERC20M-08
D5R2	361K7606	DIODE ERB44-08 V1
D5R3	361K7822	DIODE D1NL20,AT52
D5R4	361K7822	DIODE D1NL20,AT52
D5W1	36CB0072	DIODE HSM83-TL
D5X1	361K7822	DIODE D1NL20,AT52
D601	36108116	DIODE KBU605G-FA1
D602	361K7523	DIODE ERA15-04V1
D603	361K7174	DIODE RU1P V1
D604	361K7823	DI ERA18-02-V1
D622	361K7823	DI ERA18-02-V1
D623	361K7823	DI ERA18-02-V1
D624	361K7505	DIODE ERB44-06V1

SYMBOL	PART NO	DESCRIPTION
D625	361K7823	DI ERA18-02-V1
D626	361K7823	DI ERA18-02-V1
D627	36107858	DI RG2A2(LF-B4)
D628	361K7842	DIODE ERB38-06(V1)
D629	361K7823	DI ERA18-02-V1
D651	361K7842	DIODE ERB38-06(V1)
D653	361K7174	DIODE RU1P V1
D671	36107844	DIODE RU3A(LF-C4)
D672	361K7823	DI ERA18-02-V1
D673	361K7823	DI ERA18-02-V1
D6A1	36107835	DI RU3C(LF-C4)
D6E1	36107841	DIODE FMU-G16S
D6F1	36107729	DIODE YG901C2
D6G2	36107832	DI ERC30-01(L3)
D6H1	36107832	DI ERC30-01(L3)
D6K1	361K7823	DI ERA18-02-V1
D6L1	36107729	DIODE YG901C2
D6M1	36107729	DIODE YG901C2
D6P1	361K7523	DIODE ERA15-04V1
D6P2	361K7523	DIODE ERA15-04V1
D6V1	360K1025	DIODE 1SS133
D6V2	360K1025	DIODE 1SS133
D6V3	360K1025	DIODE 1SS133
D6V4	360K1025	DIODE 1SS133
D6Y1	36107320	DIODE FMG-G26S
D6Y2	36107701	DIODE RU4AM(LF-K2)
D6Y3	361K7842	DIODE ERB38-06(V1)
D711	360K1025	DIODE 1SS133
D712	360K1025	DIODE 1SS133
D713	360K1025	DIODE 1SS133
D721B	36CB0072	DIODE HSM83-TL
D721G	36CB0072	DIODE HSM83-TL
D721R	36CB0072	DIODE HSM83-TL
D722B	36CB0072	DIODE HSM83-TL
D722G	36CB0072	DIODE HSM83-TL
D722R	36CB0072	DIODE HSM83-TL
D741B	361K7777	DIODE 1SS244-T72
D741G	361K7777	DIODE 1SS244-T72
D741R	361K7777	DIODE 1SS244-T72
D771	360K1025	DIODE 1SS133
D781	360K1025	DIODE 1SS133
D782	360K1025	DIODE 1SS133
D783	36CB0072	DIODE HSM83-TL
D784	36CB0072	DIODE HSM83-TL
D7E1	360K1025	DIODE 1SS133
D7GA	360K1025	DIODE 1SS133
D7GF	360K1025	DIODE 1SS133
D7K1	361K7562	DIODE EGP10G G23

SYMBOL	PART NO	DESCRIPTION
D8A1	36CB0233	DIODE RB411D-T146
D8M2B	360K1025	DIODE 1SS133
D8M2G	360K1025	DIODE 1SS133
D8M2R	360K1025	DIODE 1SS133
D8R2	36CB0054	DIODE DA204K-T
D8R3	36CB0054	DIODE DA204K-T
D8U1	36CB0233	DIODE RB411D-T146
D951	360K1025	DIODE 1SS133
D981	36CB0213	DIODE DAN212K-T146
D982	36CB0213	DIODE DAN212K-T146
D984	36CB0213	DIODE DAN212K-T146
LED111	36801424	LED SMLS79723C
LED112	36801424	LED SMLS79723C
LED113	36801424	LED SMLS79723C
MD4P1	36CB0079	DIODE DAN202K-T146(0°)
MD4P2	36CB0054	DIODE DA204K-T
MD701B	36CB0054	DIODE DA204K-T
MD701G	36CB0054	DIODE DA204K-T
MD701R	36CB0054	DIODE DA204K-T
MD702B	36CB0054	DIODE DA204K-T
MD702G	36CB0054	DIODE DA204K-T
MD702R	36CB0054	DIODE DA204K-T
MD711	36CB0079	DIODE DAN202K-T146(0°)
MD7GE	36CB0079	DIODE DAN202K-T146(0°)
MD7GG	36CB0079	DIODE DAN202K-T146(0°)
ZD592	360A0055	DIODE MTZJ8.2B T-72
ZD5A1	360A0119	DIODE MTZJ33D-T72
ZD5E1	360A0039	DIODE MTZJ5.6B T-72
ZD5F1	360A0091	DIODE MTZJ20A
ZD5G1	360A0059	DIODE MTZJ9.1B T-72
ZD5GA	360A0035	DIODE MTZJ5.1B T-72
ZD5GC	360A0035	DIODE MTZJ5.1B T-72
ZD5X1	360A0043	DIODE MTZJ6.2B T-72
ZD621	360A0072	DIODE MTZJ12B
ZD622	360A0051	DIODE MTZJ7.5B T-72
ZD623	360K3116	DIODE RD4.7EB(3)-T4
ZD651	360A0075	DIODE MTZJ13A
ZD653	360K3120	DIODE RD24EB(3)-T4
ZD671	360A0021	DIODE MTZJ3.6B T-72
ZD672	360K3486	DI RD6.8JS AB(2)-T4
ZD6G1	360K3120	DIODE RD24EB(3)-T4
ZD6H1	360K3120	DIODE RD24EB(3)-T4
ZD6P1	360A0072	DIODE MTZJ12B
ZD6V1	360A0038	DIODE MTZJ5.6A T-72
ZD6V2	360A0064	DIODE MTZJ10C
ZD701	360A0039	DIODE MTZJ5.6B T-72
ZD702	360A0039	DIODE MTZJ5.6B T-72
ZD703	360A0039	DIODE MTZJ5.6B T-72

SYMBOL	PART NO	DESCRIPTION
ZD704	360A0039	DIODE MTZJ5.6B T-72
ZD721	360A0060	DIODE MTZJ9.1C T-72
ZD852	360A0039	DIODE MTZJ5.6B T-72
ZD853	360A0039	DIODE MTZJ5.6B T-72
ZD854	360A0018	DIODE MTZJ3.3B T-72
ZD8A1	360A0039	DIODE MTZJ5.6B T-72
ZD8A2	360A0039	DIODE MTZJ5.6B T-72
ZD951	360A0039	DIODE MTZJ5.6B T-72
ZD981	360A0026	DIODE MTZJ4.3A T-72

*** TRANSFORMERS ***

T551	45804033	TRANS,H.DRAIVE
T561	47710028	TRANS,H.OUTPUT
T5R1	47105736	FBT
T601	46311124	SWITCHING TRANS
T651	46305106	TRANS,SWITCHING (EER28)
T6Y1	46316102	SWITCHING TRANS
T981	45950005	D.F.TRANS(W515K)

*** VARIABLE RESISTORS ***

VR581	410G1157	R,VARIABLE B1.0K
VR5T1	415K5163	R,VARIABLE B200K

*** RELAYS & SWITCHES ***

RL6V1	65660047	RELAY RPEF-12
RL6V2	65660047	RELAY RPEF-12
SW101	65360051	TACT SWITCH SKHHQV
SW102	65360051	TACT SWITCH SKHHQV
SW103	65360051	TACT SWITCH SKHHQV
SW104	65360051	TACT SWITCH SKHHQV
SW105	65360051	TACT SWITCH SKHHQV
SW106	65360051	TACT SWITCH SKHHQV
SW107	65360051	TACT SWITCH SKHHQV
SW108	65360051	TACT SWITCH SKHHQV
SW581	65161075	SWITCH SLIDE SSSF022-S09N
SW601	65360071	PUSH SWITCH ESB92S21B

*** PWB ASSYS ***

	843E6A02	SW/HV PWB ASSY
	843E6B01	SUB PWB ASSY
	843E6C03	VIDEO PWB ASSY
	843E6D02	DEF PWB ASSY
	843E6P01	CONV PWB ASSY

*** COILS & FILTERS ***

DEG	61322101	DEGAUSSIING COIL(85T,10H)
EMC	61322303	CORNER COIL(190T,50H)
EMF	61322304	COIL(50T,40H)

SYMBOL	PART NO	DESCRIPTION
FL561	616J9019	FERAITE BEADS HF55BTL
FL6T1	61062235	COIL,FILTER (LFZ2805V10)
FL6T2	61062234	COIL,FILTER (LFZ2404V11)
L561	610G0342	CHOKECOIL TSL1112RA-331KR
L562	46204008	COIL,CHOKE 4MH
L5G1	610F3025	COIL,FILTER 47UH
L5G2	46205005	COIL,CHOKE 4MH (EI25)
L5R1	610G0233	FILTER CHOKE PJ8T-470K
L5R2	610F3014	COIL,FILTER 3.3UH
L601	616K5076	COIL,BEADS
L602	616K5076	COIL,BEADS
L621	610E4001	COIL,FILTER 10UH
L622	610E4001	COIL,FILTER 10UH
L6A1	610G0335	CHOKECOIL TSL1112RA-680K1
L6E1	610F3023	COIL,FILTER 33UH
L6E2	610G0322	CHOKECOIL TSL0709-101KR66
L6F1	610G0333	CHOKECOIL TSL1112RA-330K2
L6F2	610G0333	CHOKECOIL TSL1112RA-330K2
L6H1	610F3023	COIL,FILTER 33UH
L6H2	610G0335	CHOKECOIL TSL1112RA-680K1
L6K1	610F3023	COIL,FILTER 33UH
L6L1	610G0333	CHOKECOIL TSL1112RA-330K2
L6M1	610G0333	CHOKECOIL TSL1112RA-330K2
L6Y1	61099166	COIL,CHOKE 400UH
L711	610E1729	COIL,FILTER 100UH
L731	610G0111	INDUCTOR,BEADS(FBR07HA121
L732	610G0111	INDUCTOR,BEADS(FBR07HA121
L763	610F3025	COIL,FILTER 47UH
L791	610E1725	COIL,FILTER 47UH
L901B	610F6505	COIL,FILTER 0.22UH
L901G	610F6505	COIL,FILTER 0.22UH
L901R	610F6505	COIL,FILTER 0.22UH
LC151	616K6971	NOISE FILTER TY2E103MCT
LC4H1	616K6971	NOISE FILTER TY2E103MCT
LC763	616K6942	NOISE FILTER FILMAC TU20M
LC764	616K6942	NOISE FILTER FILMAC TU20M
LC765	616K6942	NOISE FILTER FILMAC TU20M
LC766	616K6942	NOISE FILTER FILMAC TU20M
LC767	390J9028	FILTER ZJSC-R47-391TA
LC768	390J9028	FILTER ZJSC-R47-391TA
LC769	616K6970	NOISE FILTER TY2E101MCT
LC76A	616K6970	NOISE FILTER TY2E101MCT
LC76E	616K6971	NOISE FILTER TY2E103MCT
LC76F	616K6971	NOISE FILTER TY2E103MCT
LC76G	616K6971	NOISE FILTER TY2E103MCT
LC76H	616K6971	NOISE FILTER TY2E103MCT
LC76K	616K6971	NOISE FILTER TY2E103MCT
LC76M	616K6971	NOISE FILTER TY2E103MCT

SYMBOL	PART NO	DESCRIPTION
LC76N	616K6971	NOISE FILTER TY2E103MCT
LC76R	390J9028	FILTER ZJSC-R47-391TA
LC851	616K6970	NOISE FILTER TY2E101MCT
LC852	616K6970	NOISE FILTER TY2E101MCT
LC853	616K6970	NOISE FILTER TY2E101MCT
LC854	616K6971	NOISE FILTER TY2E103MCT
LC901	616K6971	NOISE FILTER TY2E103MCT
LC902	616K6971	NOISE FILTER TY2E103MCT
LC903	616K6970	NOISE FILTER TY2E101MCT
MR8U1	39032303	R,NETWORK 8L 10K 1/50W
MR8U2	39032303	R,NETWORK 8L 10K 1/50W
MRC801	39040002	RC,NETWORK 10K 1K 0.01UF
MRC802	39040002	RC,NETWORK 10K 1K 0.01UF
R5R3	616J9019	FERAITE BEADS HF55BTL
T571	60918114	COIL,VARIABLE LIN.

*** ELECTRICAL PARTS & MISCELLANEOUS PARTS ***

ADAPTE	70599171	ADAPTER(MAC),SXGA
CABLE	73893283	SIGNAL CABLE MD15P J-H
CNBNC	32990281	PANEL,MD-SUB/BNC
CNCRT	70032275	CRT SOCKET HPS0720-015005
CORD	70810778	POWER CORD U-3 L1.8 GRY,S
F671	666J9242	FUSE 25101.6,AT52
F6H1	666J9141	FUSE 25102.5,AT52
F6T1	66671040	FUSE 250V 5A(215)
IC2001	79645922	HV PROTECTOR UNIT
IC4H1	79610572	UNIT,SENSOR TMC3000NF(7)
IN6T1	70521069	INLET SK-1019(DELTA)
PC621	38200354	PHOTOCOUPLER PC123FY2
PC651	38200354	PHOTOCOUPLER PC123FY2
PC6P1	38200354	PHOTOCOUPLER PC123FY2
SG901B	329J0047	ARRESTER (300V),AT52
SG901G	329J0047	ARRESTER (300V),AT52
SG901R	329J0047	ARRESTER (300V),AT52
SG902	329J0047	ARRESTER (300V),AT52
SG903	667K6007	SPARK GAP 1.5KV
SG951	667K6007	SPARK GAP 1.5KV
TH6V1	38112071	POSISTOR (PTH451A180M270A
TH6V2	38112072	POSISTOR (PTH451ABG3R0Q14
USBCAB	73893284	USB CABLE (COA1) J-PC99
X801	64098039	X'TAL(10.000MHZ)
X851	64098070	X'TAL HC-49U/S(6MHZ)CIT
X8M1	64098075	X'TAL 20MHZ(CSA-309)
X8U1	64098072	X'TAL 25MHZ(CSA-309)

*** KNOBS & PUSH BUTTONS ***

A4501	2E457751	PUSH BUTTON(CONTROL)

SYMBOL	PART NO	DESCRIPTION
*** APPEARANCE PARTS ***		
A3001	2E323932	CABINET FRONT ASSY
A3002	2E322123	CABINET BACK
A4001	25430552	CONTROL PANEL
A4003	2E430783	REVOLVING STAND ASSY
A5004	2E548061	CHASSIS BASE
*** PRINTED & PACKING MATERIALS ***		
A7001	2E790461	NAME PLATE,INSTRUCTION
A7501	2E790481	LABEL(CRA)(720MX)
A8001	2E837641	CARTON BOX(CN921A)
A8003	2E835891	FILLER(T).CARTON
A8004	2E835901	FILLER(B).CARTON
A8005	2E836001	PLATE,PULL
A8007	2E833831	SHEET PROTECTION
GPNAME	2E785131	LABEL(PTB)
GPNAME	2E788571	LABEL(CE)
CDROM	68830763	FP950/1350 CD-ROM VER1.1
MANUAL	78135163	MANUAL CN871/756/921A USA
*** RESISTORS ***		
J413	40AA1000	R,CHIP 0H 5% 1/8W
J414	40AA1000	R,CHIP 0H 5% 1/8W
J415	40AA1000	R,CHIP 0H 5% 1/8W
J416	40AA1000	R,CHIP 0H 5% 1/8W
J419	40AA1000	R,CHIP 0H 5% 1/8W
J420	40AA1000	R,CHIP 0H 5% 1/8W
J421	40AA1000	R,CHIP 0H 5% 1/8W
J422	40AA1000	R,CHIP 0H 5% 1/8W
J423	40AA1000	R,CHIP 0H 5% 1/8W
J424	40AA1000	R,CHIP 0H 5% 1/8W
J5W1	40AAD100	R,CHIP 0.0H 5% 1/2W
J5W2	40AA1000	R,CHIP 0H 5% 1/8W
J5W3	40AA1000	R,CHIP 0H 5% 1/8W
J5W4	40AA1000	R,CHIP 0H 5% 1/8W
J5W5	40AA1000	R,CHIP 0H 5% 1/8W
J5W7	40AAD100	R,CHIP 0.0H 5% 1/2W
J5W8	40AA1000	R,CHIP 0H 5% 1/8W
J5W9	40AA1000	R,CHIP 0H 5% 1/8W
J5Y1	40AA1000	R,CHIP 0H 5% 1/8W
J5Y2	40AA1000	R,CHIP 0H 5% 1/8W
J5Y3	40AA1000	R,CHIP 0H 5% 1/8W
J5Y4	40AA1000	R,CHIP 0H 5% 1/8W
J5Y5	40AA1000	R,CHIP 0H 5% 1/8W
J733	40AA3000	R,CHIP 0.0H 5% 1/10W
J8N1	40AA3000	R,CHIP 0.0H 5% 1/10W
J8N2	40AA3000	R,CHIP 0.0H 5% 1/10W
J8N3	40AA3000	R,CHIP 0.0H 5% 1/10W

SYMBOL	PART NO	DESCRIPTION
J8N4	40AA3000	R,CHIP 0.0H 5% 1/10W
J952	40AA1000	R,CHIP 0H 5% 1/8W
LC761B	401J9820	R,CARBON 0.0H
LC761G	401J9820	R,CARBON 0.0H
LC761R	401J9820	R,CARBON 0.0H
LC762B	401J9820	R,CARBON 0.0H
LC762G	401J9820	R,CARBON 0.0H
LC762R	401J9820	R,CARBON 0.0H
R101	40AAD129	R,CHIP 15H 5% 1/2W
R102	40AB3161	R,CHIP 330H 1% 1/10W
R103	40AB3173	R,CHIP 1.0K 1% 1/10W
R104	40AB3169	R,CHIP 680H 1% 1/10W
R105	40AB3170	R,CHIP 750H 1% 1/10W
R106	40AB3155	R,CHIP 180H 1% 1/10W
R111	40AA3125	R,CHIP 10H 5% 1/10W
R112	40AA3125	R,CHIP 10H 5% 1/10W
R113	40AA3125	R,CHIP 10H 5% 1/10W
R151	40AA3146	R,CHIP 75H 5% 1/10W
R2001	404K5109	R,METAL 2.2H 5% 1/4W
R2002	40AB3224	R,CHIP 130K 1% 1/10W
R401	40AA3181	R,CHIP 2.2K 5% 1/10W
R402	40AC7301	R,CHIP 1.0H 5% 1/2W
R403	40AB3199	R,CHIP 12K 1% 1/10W
R404	40AB3183	R,CHIP 2.7K 1% 1/10W
R405	40AAD189	R,CHIP 4.7K 5% 1/2W
R406	40499440	R,METAL 1.0H 1% 1W
R411	40AB3211	R,CHIP 39K 1% 1/10W
R412	40AA3159	R,CHIP 270H 5% 1/10W
R413	40AB3208	R,CHIP 30K 1% 1/10W
R414	40AA2165	R,CHIP 470H 5% 1/4W
R421	40AA3197	R,CHIP 10K 5% 1/10W
R422	40AA3197	R,CHIP 10K 5% 1/10W
R423	40AA3197	R,CHIP 10K 5% 1/10W
R424	40AA3197	R,CHIP 10K 5% 1/10W
R425	40AB3197	R,CHIP 10K 1% 1/10W
R426	40AB3197	R,CHIP 10K 1% 1/10W
R427	40AB3197	R,CHIP 10K 1% 1/10W
R428	40AB3197	R,CHIP 10K 1% 1/10W
R429	40AA3215	R,CHIP 56K 5% 1/10W
R42A	40AA3149	R,CHIP 100H 5% 1/10W
R42D	40AA3149	R,CHIP 100H 5% 1/10W
R42E	40AA3149	R,CHIP 100H 5% 1/10W
R4H1	401K5721	R,CARBON 100K 5% 1/6W
R4H2	401K5697	R,CARBON 10K 5% 1/6W
R4H5	401K5721	R,CARBON 100K 5% 1/6W
R4H6	401K5697	R,CARBON 10K 5% 1/6W
R4H7	404C1680	R,METAL 2.0K 1% 1/6W
R4H8	404C1673	R,METAL 1.0K 1% 1/6W

SYMBOL	PART NO	DESCRIPTION
R4H9	404K5125	R,METAL 10H 5% 1/4W
R4J1	40AA3199	R,CHIP 12K 5% 1/10W
R4J2	40AA3149	R,CHIP 100H 5% 1/10W
R4J6	40372137	R,METAL 33H 5% 2W
R4J7	40AA3207	R,CHIP 27K 5% 1/10W
R4K1	40AA3199	R,CHIP 12K 5% 1/10W
R4K2	40AA3149	R,CHIP 100H 5% 1/10W
R4K6	40371145	R,METAL 68H 5% 1W
R4K7	40AA3207	R,CHIP 27K 5% 1/10W
R4K8	40AA3217	R,CHIP 68K 5% 1/10W
R4K9	40AA3210	R,CHIP 36K 5% 1/10W
R4KE	40AA2155	R,CHIP 180H 5% 1/4W
R4L1	40AA3199	R,CHIP 12K 5% 1/10W
R4L2	40AA3149	R,CHIP 100H 5% 1/10W
R4L6	40372139	R,METAL 39H 5% 2W
R4L7	40AA3207	R,CHIP 27K 5% 1/10W
R4M1	40AA3199	R,CHIP 12K 5% 1/10W
R4M2	40AA3149	R,CHIP 100H 5% 1/10W
R4M6	40372139	R,METAL 39H 5% 2W
R4M7	40AA3207	R,CHIP 27K 5% 1/10W
R4N1	40AA3199	R,CHIP 12K 5% 1/10W
R4N2	40AA3149	R,CHIP 100H 5% 1/10W
R4N6	40372139	R,METAL 39H 5% 2W
R4N7	40AA3207	R,CHIP 27K 5% 1/10W
R4P1	40AB3219	R,CHIP 82K 1% 1/10W
R4P4	404C1740	R,METAL 620K 1% 1/6W
R4P5	40AA3149	R,CHIP 100H 5% 1/10W
R4P6	40AA3000	R,CHIP 0.0H 5% 1/10W
R4P7	40AA3197	R,CHIP 10K 5% 1/10W
R4P8	404J9476	R,METAL 2.2M 1% 1/4W
R4P9	404C1745	R,METAL 1.0M 1% 1/6W
R4PA	40AB3225	R,CHIP 150K 1% 1/10W
R4PE	40AB3203	R,CHIP 18K 1% 1/10W
R4PF	40AB3212	R,CHIP 43K 1% 1/10W
R4PH	40AB3219	R,CHIP 82K 1% 1/10W
R4R1	40AA3199	R,CHIP 12K 5% 1/10W
R4R2	40AA3149	R,CHIP 100H 5% 1/10W
R4R6	40372139	R,METAL 39H 5% 2W
R4R7	40AA3207	R,CHIP 27K 5% 1/10W
R501	40AA3173	R,CHIP 1.0K 5% 1/10W
R502	40AA1155	R,CHIP 180H 5% 1/8W
R503	40AB3177	R,CHIP 1.5K 1% 1/10W
R504	40AB3168	R,CHIP 620H 1% 1/10W
R506	40AA3169	R,CHIP 680H 5% 1/10W
R507	40AA3169	R,CHIP 680H 5% 1/10W
R508	40AB3176	R,CHIP 1.3K 1% 1/10W
R509	40AA3199	R,CHIP 12K 5% 1/10W
R50A	40AB3183	R,CHIP 2.7K 1% 1/10W

SYMBOL	PART NO	DESCRIPTION
R50C	40AB3182	R,CHIP 2.4K 1% 1/10W
R50E	40AB3210	R,CHIP 36K 1% 1/10W
R50G	40AB3197	R,CHIP 10K 1% 1/10W
R50H	40AB3199	R,CHIP 12K 1% 1/10W
R50J	40AA3221	R,CHIP 100K 5% 1/10W
R50K	40AB3187	R,CHIP 3.9K 1% 1/10W
R50L	40AB3215	R,CHIP 56K 1% 1/10W
R50M	40AB3215	R,CHIP 56K 1% 1/10W
R50P	40AA3197	R,CHIP 10K 5% 1/10W
R510	40AA1151	R,CHIP 120H 5% 1/8W
R511	40AA3245	R,CHIP 1.0M 5% 1/10W
R512	40AA3173	R,CHIP 1.0K 5% 1/10W
R513	40AA3189	R,CHIP 4.7K 5% 1/10W
R514	40AA3221	R,CHIP 100K 5% 1/10W
R515	40AA2165	R,CHIP 470H 5% 1/4W
R516	40AA3173	R,CHIP 1.0K 5% 1/10W
R517	40AA3173	R,CHIP 1.0K 5% 1/10W
R518	40AA3190	R,CHIP 5.1K 5% 1/10W
R519	40AA3193	R,CHIP 6.8K 5% 1/10W
R51A	40AA3149	R,CHIP 100H 5% 1/10W
R51F	40AA3190	R,CHIP 5.1K 5% 1/10W
R51G	40AA3169	R,CHIP 680H 5% 1/10W
R51P	404K5125	R,METAL 10H 5% 1/4W
R51R	404K5133	R,METAL 22H 5% 1/4W
R51W	40AA3189	R,CHIP 4.7K 5% 1/10W
R520	40AA3190	R,CHIP 5.1K 5% 1/10W
R521	40AA3197	R,CHIP 10K 5% 1/10W
R522	40AA3149	R,CHIP 100H 5% 1/10W
R523	40AA3149	R,CHIP 100H 5% 1/10W
R524	40AA3149	R,CHIP 100H 5% 1/10W
R525	40AA3197	R,CHIP 10K 5% 1/10W
R526	40AA3173	R,CHIP 1.0K 5% 1/10W
R527	40AA3173	R,CHIP 1.0K 5% 1/10W
R528	40AA3197	R,CHIP 10K 5% 1/10W
R529	40AA3208	R,CHIP 30K 5% 1/10W
R52A	40AA3165	R,CHIP 470H 5% 1/10W
R52C	40AA3161	R,CHIP 330H 5% 1/10W
R52E	40AA3173	R,CHIP 1.0K 5% 1/10W
R52F	40AA3173	R,CHIP 1.0K 5% 1/10W
R52H	40AA3173	R,CHIP 1.0K 5% 1/10W
R531	40AA3173	R,CHIP 1.0K 5% 1/10W
R532	40AA1149	R,CHIP 100H 5% 1/8W
R533	40AA3149	R,CHIP 100H 5% 1/10W
R53E	40AA3149	R,CHIP 100H 5% 1/10W
R53F	40AA3149	R,CHIP 100H 5% 1/10W
R540	40AA3209	R,CHIP 33K 5% 1/10W
R541	40AA3197	R,CHIP 10K 5% 1/10W
R542	40AA3173	R,CHIP 1.0K 5% 1/10W

SYMBOL	PART NO	DESCRIPTION
R543	40AA3173	R,CHIP 1.0K 5% 1/10W
R544	40AA3173	R,CHIP 1.0K 5% 1/10W
R545	40AB3197	R,CHIP 10K 1% 1/10W
R546	40AB3197	R,CHIP 10K 1% 1/10W
R548	40AA3197	R,CHIP 10K 5% 1/10W
R549	40AA3208	R,CHIP 30K 5% 1/10W
R54A	40AA3173	R,CHIP 1.0K 5% 1/10W
R556	40AA3149	R,CHIP 100H 5% 1/10W
R557	404J9510	R,METAL 2.2H 5% 1/4W
R558	40AA3125	R,CHIP 10H 5% 1/10W
R559	40371133	R,METAL 22H 5% 1W
R55A	40399098	R,METAL 1.0H 5% 5W
R55E	40AA3197	R,CHIP 10K 5% 1/10W
R55K	401J9820	R,CARBON 0.0H
R561	40371125	R,METAL 10H 5% 1W
R562	40373127	R,METAL 12H 5% 3W
R56A	40AB3211	R,CHIP 39K 1% 1/10W
R56C	40AB3199	R,CHIP 12K 1% 1/10W
R56E	40AA3197	R,CHIP 10K 5% 1/10W
R56F	40AA3205	R,CHIP 22K 5% 1/10W
R571	40383028	R,METAL 180H 5% 3W
R573	40AA1239	R,CHIP 560K 5% 1/8W
R574	40AA1239	R,CHIP 560K 5% 1/8W
R575	40AA1239	R,CHIP 560K 5% 1/8W
R576	40AA1239	R,CHIP 560K 5% 1/8W
R577	40AA1239	R,CHIP 560K 5% 1/8W
R578	40AA1239	R,CHIP 560K 5% 1/8W
R579	40AA3149	R,CHIP 100H 5% 1/10W
R57A	40AA3149	R,CHIP 100H 5% 1/10W
R57C	40AA3149	R,CHIP 100H 5% 1/10W
R57E	40AA3149	R,CHIP 100H 5% 1/10W
R57F	40AA3149	R,CHIP 100H 5% 1/10W
R57J	40AA3149	R,CHIP 100H 5% 1/10W
R57K	40373141	R,METAL 47H 5% 3W
R57L	40AA3189	R,CHIP 4.7K 5% 1/10W
R57M	40AA3173	R,CHIP 1.0K 5% 1/10W
R57N	40AA3197	R,CHIP 10K 5% 1/10W
R57P	40AA3213	R,CHIP 47K 5% 1/10W
R57T	40AA5145	R,CHIP 68H 5% 1/4W
R57X	40AA3149	R,CHIP 100H 5% 1/10W
R57Y	40AA1239	R,CHIP 560K 5% 1/8W
R581	40AA1165	R,CHIP 470H 5% 1/8W
R582	40AA3125	R,CHIP 10H 5% 1/10W
R583	40371129	R,METAL 15H 5% 1W
R584	40371131	R,METAL 18H 5% 1W
R592	40AB3223	R,CHIP 120K 1% 1/10W
R593	40AB3197	R,CHIP 10K 1% 1/10W
R595	40AA1205	R,CHIP 22K 5% 1/8W

SYMBOL	PART NO	DESCRIPTION
R596	40AA1213	R,CHIP 47K 5% 1/8W
R597	40AA1197	R,CHIP 10K 5% 1/8W
R598	40AA3209	R,CHIP 33K 5% 1/10W
R599	40AB3233	R,CHIP 330K 1% 1/10W
R59A	40AB3224	R,CHIP 130K 1% 1/10W
R59C	40AB3206	R,CHIP 24K 1% 1/10W
R59E	40AB3205	R,CHIP 22K 1% 1/10W
R59F	40AA3199	R,CHIP 12K 5% 1/10W
R59G	40AB3185	R,CHIP 3.3K 1% 1/10W
R59J	40AA3218	R,CHIP 75K 5% 1/10W
R59K	40AA3191	R,CHIP 5.6K 5% 1/10W
R59L	40AA3197	R,CHIP 10K 5% 1/10W
R59M	40AB3200	R,CHIP 13K 1% 1/10W
R59N	404K5133	R,METAL 22H 5% 1/4W
R59P	40AB3201	R,CHIP 15K 1% 1/10W
R59R	40AB5223	R,CHIP 120K 1% 1/2W
R59T	40AB3175	R,CHIP 1.2K 1% 1/10W
R59W	40AA3197	R,CHIP 10K 5% 1/10W
R5A1	404K5125	R,METAL 10H 5% 1/4W
R5A3	40AA3201	R,CHIP 15K 5% 1/10W
R5A4	40AB3229	R,CHIP 220K 1% 1/10W
R5A5	40AA3197	R,CHIP 10K 5% 1/10W
R5A6	40AA3197	R,CHIP 10K 5% 1/10W
R5A7	40AA3191	R,CHIP 5.6K 5% 1/10W
R5A8	40AA3239	R,CHIP 560K 5% 1/10W
R5A9	404J9509	R,METAL 470H 1% 1/4W
R5AC	40AA3191	R,CHIP 5.6K 5% 1/10W
R5AE	40371221	R,METAL 100K 5% 1W
R5E1	404J9510	R,METAL 2.2H 5% 1/4W
R5E2	40AA3179	R,CHIP 1.8K 5% 1/10W
R5E3	40371187	R,METAL 3.9K 5% 1W
R5E4	40AA3000	R,CHIP 0.0H 5% 1/10W
R5E5	40AA3155	R,CHIP 180H 5% 1/10W
R5F1	40371339	R,METAL 0.56H 5% 1W
R5F2	401G6191	R,CARBON 5.6K 5% 1/4W
R5F3	40AA3235	R,CHIP 390K 5% 1/10W
R5F4	40AA3221	R,CHIP 100K 5% 1/10W
R5F5	40AA3197	R,CHIP 10K 5% 1/10W
R5F6	40AA1207	R,CHIP 27K 5% 1/8W
R5F7	40AA3205	R,CHIP 22K 5% 1/10W
R5F8	40AB3197	R,CHIP 10K 1% 1/10W
R5G1	40AA5141	R,CHIP 47H 5% 1/4W
R5G2	40AA3195	R,CHIP 8.2K 5% 1/10W
R5G3	40AC5309	R,CHIP 2.2H 5% 1/8W
R5GA	40AAD163	R,CHIP 390H 5% 1/2W
R5GC	40AAD163	R,CHIP 390H 5% 1/2W
R5GE	40AB3201	R,CHIP 15K 1% 1/10W
R5GF	40AB3197	R,CHIP 10K 1% 1/10W

SYMBOL	PART NO	DESCRIPTION
R5P1	40AA2139	R,CHIP 39H 5% 1/4W
R5P2	40AA2141	R,CHIP 47H 5% 1/4W
R5R1	40224137	R,WIRE 33H 5% 5W
R5R2	40224137	R,WIRE 33H 5% 5W
R5T1	401K5717	R,CARBON 68K 5% 1/6W
R5T2	404C1718	R,METAL 75K 1% 1/6W
R5U1	40AB3183	R,CHIP 2.7K 1% 1/10W
R5U2	40AB3219	R,CHIP 82K 1% 1/10W
R5U3	40AB1231	R,CHIP 270K 1% 1/8W
R5W1	40AA3211	R,CHIP 39K 5% 1/10W
R5W2	40AA3201	R,CHIP 15K 5% 1/10W
R5W3	40AA3197	R,CHIP 10K 5% 1/10W
R5W6	40AA3214	R,CHIP 51K 5% 1/10W
R5W7	40AA3213	R,CHIP 47K 5% 1/10W
R5W8	40AB3180	R,CHIP 2.0K 1% 1/10W
R5W9	40AA3197	R,CHIP 10K 5% 1/10W
R5X1	404K5125	R,METAL 10H 5% 1/4W
R5X2	40AA2199	R,CHIP 12K 5% 1/4W
R5X3	40AA3221	R,CHIP 100K 5% 1/10W
R5X4	40AB3226	R,CHIP 160K 1% 1/10W
R5X5	40AB3201	R,CHIP 15K 1% 1/10W
R5Y1	40AA3197	R,CHIP 10K 5% 1/10W
R602	40299104	R,WIRE 10H 5% 5W
R603	40AA3197	R,CHIP 10K 5% 1/10W
R604	40372143	R,METAL 56H 5% 2W
R605	40299181	R,WIRE 56K 5% 5W
R606	40299104	R,WIRE 10H 5% 5W
R621	40AA3169	R,CHIP 680H 5% 1/10W
R622	40371103	R,METAL 1.2H 5% 1W
R623	40371337	R,METAL 0.47H 5% 1W
R624	40AB3149	R,CHIP 100H 1% 1/10W
R625	40499462	R,METAL 0.12H 5% 3W
R626	404C1689	R,METAL 4.7K 1% 1/6W
R627	404C1745	R,METAL 1.0M 1% 1/6W
R628	404C1745	R,METAL 1.0M 1% 1/6W
R629	40AB3217	R,CHIP 68K 1% 1/10W
R630	40AB3217	R,CHIP 68K 1% 1/10W
R631	401K5739	R,CARBON 560K 5% 1/6W
R632	401K5739	R,CARBON 560K 5% 1/6W
R633	40AA3205	R,CHIP 22K 5% 1/10W
R634	40372217	R,METAL 68K 5% 2W
R635	40372221	R,METAL 100K 5% 2W
R636	401G6109	R,CARBON 2.2H 5% 1/4W
R638	40372197	R,METAL 10K 5% 2W
R639	40AA3179	R,CHIP 1.8K 5% 1/10W
R640	40AA3169	R,CHIP 680H 5% 1/10W
R641	40AA3171	R,CHIP 820H 5% 1/10W
R642	40AA3221	R,CHIP 100K 5% 1/10W

SYMBOL	PART NO	DESCRIPTION
R651	401K5643	R,CARBON 56H 5% 1/6W
R652	40AA3181	R,CHIP 2.2K 5% 1/10W
R653	40AA3181	R,CHIP 2.2K 5% 1/10W
R655	40371209	R,METAL 33K 5% 1W
R656	40AB3185	R,CHIP 3.3K 1% 1/10W
R657	40AA3149	R,CHIP 100H 5% 1/10W
R658	401K5697	R,CARBON 10K 5% 1/6W
R659	40372139	R,METAL 39H 5% 2W
R660	40372207	R,METAL 27K 5% 2W
R662	401C6665	R,CARBON 470H 5% 1/4W
R663	40AB3213	R,CHIP 47K 1% 1/10W
R664	40AB3193	R,CHIP 6.8K 1% 1/10W
R665	40AA3201	R,CHIP 15K 5% 1/10W
R666	401C6665	R,CARBON 470H 5% 1/4W
R671	40373109	R,METAL 2.2H 5% 3W
R672	40AA3189	R,CHIP 4.7K 5% 1/10W
R673	40AA3169	R,CHIP 680H 5% 1/10W
R674	40373187	R,METAL 3.9K 5% 3W
R675	40AA3177	R,CHIP 1.5K 5% 1/10W
R676	401K5671	R,CARBON 820H 5% 1/6W
R677	40371199	R,METAL 12K 5% 1W
R678	40AA3219	R,CHIP 82K 5% 1/10W
R694	404C1745	R,METAL 1.0M 1% 1/6W
R695	404C1745	R,METAL 1.0M 1% 1/6W
R696	40AA3187	R,CHIP 3.9K 5% 1/10W
R697	40AA3219	R,CHIP 82K 5% 1/10W
R6A1	40371221	R,METAL 100K 5% 1W
R6E1	40372199	R,METAL 12K 5% 2W
R6F1	40499508	R,METAL 0.1H 5% 1/2W
R6G1	40499507	R,METAL 0.22H 5% 1/2W
R6K1	404E1329	R,METAL 0.22H 5% 1/4W
R6K2	401K5669	R,CARBON 680H 5% 1/6W
R6L1	40372167	R,METAL 560H 5% 2W
R6L2	401G6125	R,CARBON 10H 5% 1/4W
R6M2	401G6125	R,CARBON 10H 5% 1/4W
R6P1	40372217	R,METAL 68K 5% 2W
R6P2	401K5701	R,CARBON 15K 5% 1/6W
R6T1	401H6757	R,CARBON 3.3M 5% 1/2W
R6V1	401C6631	R,CARBON 18H 5% 1/4W
R6V2	401G6109	R,CARBON 2.2H 5% 1/4W
R6V3	401K5697	R,CARBON 10K 5% 1/6W
R6V4	401K5669	R,CARBON 680H 5% 1/6W
R6V5	401K5691	R,CARBON 5.6K 5% 1/6W
R6V6	401K5721	R,CARBON 100K 5% 1/6W
R6V7	401K5745	R,CARBON 1.0M 5% 1/6W
R6V8	401K5721	R,CARBON 100K 5% 1/6W
R6V9	401K5689	R,CARBON 4.7K 5% 1/6W
R6W0	401K5673	R,CARBON 1.0K 5% 1/6W

SYMBOL	PART NO	DESCRIPTION
R6W1	401K5689	R,CARBON 4.7K 5% 1/6W
R6W2	404C1715	R,METAL 56K 1% 1/6W
R6W3	401K5663	R,CARBON 390H 5% 1/6W
R701B	40AB3153	R,CHIP 150H 1% 1/10W
R701G	40AB3153	R,CHIP 150H 1% 1/10W
R701R	40AB3153	R,CHIP 150H 1% 1/10W
R702B	40AB3153	R,CHIP 150H 1% 1/10W
R702G	40AB3153	R,CHIP 150H 1% 1/10W
R702R	40AB3153	R,CHIP 150H 1% 1/10W
R703B	40AB3153	R,CHIP 150H 1% 1/10W
R703G	40AB3153	R,CHIP 150H 1% 1/10W
R703R	40AB3153	R,CHIP 150H 1% 1/10W
R704B	40AB3153	R,CHIP 150H 1% 1/10W
R704G	40AB3153	R,CHIP 150H 1% 1/10W
R704R	40AB3153	R,CHIP 150H 1% 1/10W
R709	40AA3175	R,CHIP 1.2K 5% 1/10W
R70A	40AA3143	R,CHIP 56H 5% 1/10W
R70E	40AA3175	R,CHIP 1.2K 5% 1/10W
R70F	40AA3143	R,CHIP 56H 5% 1/10W
R712	40AA3149	R,CHIP 100H 5% 1/10W
R713	40AB3199	R,CHIP 12K 1% 1/10W
R714	40AB3177	R,CHIP 1.5K 1% 1/10W
R716B	40AAD165	R,CHIP 470H 5% 1/2W
R716G	40AAD165	R,CHIP 470H 5% 1/2W
R716R	40AAD165	R,CHIP 470H 5% 1/2W
R717B	40AA3151	R,CHIP 120H 5% 1/10W
R717G	40AA3151	R,CHIP 120H 5% 1/10W
R717R	40AA3151	R,CHIP 120H 5% 1/10W
R718B	40AAD159	R,CHIP 270H 5% 1/2W
R718G	40AAD159	R,CHIP 270H 5% 1/2W
R718R	40AAD159	R,CHIP 270H 5% 1/2W
R719B	40AA3151	R,CHIP 120H 5% 1/10W
R719G	40AA3151	R,CHIP 120H 5% 1/10W
R719R	40AA3151	R,CHIP 120H 5% 1/10W
R71A	40AA3177	R,CHIP 1.5K 5% 1/10W
R71E	40AA3173	R,CHIP 1.0K 5% 1/10W
R71F	40AA3149	R,CHIP 100H 5% 1/10W
R71G	40AA3149	R,CHIP 100H 5% 1/10W
R71H	40AA3155	R,CHIP 180H 5% 1/10W
R71K	40AA3000	R,CHIP 0.0H 5% 1/10W
R721B	40AA3149	R,CHIP 100H 5% 1/10W
R721G	40AA3149	R,CHIP 100H 5% 1/10W
R721R	40AA3149	R,CHIP 100H 5% 1/10W
R722B	40AB3185	R,CHIP 3.3K 1% 1/10W
R722G	40AB3185	R,CHIP 3.3K 1% 1/10W
R722R	40AB3185	R,CHIP 3.3K 1% 1/10W
R723B	40AB3171	R,CHIP 820H 1% 1/10W
R723G	40AB3171	R,CHIP 820H 1% 1/10W

SYMBOL	PART NO	DESCRIPTION
R723R	40AB3171	R,CHIP 820H 1% 1/10W
R724B	40AB3151	R,CHIP 120H 1% 1/10W
R724G	40AB3151	R,CHIP 120H 1% 1/10W
R724R	40AB3151	R,CHIP 120H 1% 1/10W
R725B	40AB3159	R,CHIP 270H 1% 1/10W
R725G	40AB3159	R,CHIP 270H 1% 1/10W
R725R	40AB3159	R,CHIP 270H 1% 1/10W
R726B	40AA3149	R,CHIP 100H 5% 1/10W
R726G	40AA3149	R,CHIP 100H 5% 1/10W
R726R	40AA3149	R,CHIP 100H 5% 1/10W
R727B	40AA3149	R,CHIP 100H 5% 1/10W
R727G	40AA3149	R,CHIP 100H 5% 1/10W
R727R	40AA3149	R,CHIP 100H 5% 1/10W
R728	40AAD163	R,CHIP 390H 5% 1/2W
R72E	40AA3173	R,CHIP 1.0K 5% 1/10W
R72F	40AA3173	R,CHIP 1.0K 5% 1/10W
R72G	40AA3173	R,CHIP 1.0K 5% 1/10W
R72HB	40AB3159	R,CHIP 270H 1% 1/10W
R72HG	40AB3159	R,CHIP 270H 1% 1/10W
R72HR	40AB3159	R,CHIP 270H 1% 1/10W
R72KB	40AA3149	R,CHIP 100H 5% 1/10W
R72KG	40AA3149	R,CHIP 100H 5% 1/10W
R72KR	40AA3149	R,CHIP 100H 5% 1/10W
R731	40AA3149	R,CHIP 100H 5% 1/10W
R732	40AA3149	R,CHIP 100H 5% 1/10W
R733	40AA3149	R,CHIP 100H 5% 1/10W
R734	40AA3149	R,CHIP 100H 5% 1/10W
R736B	40AA3143	R,CHIP 56H 5% 1/10W
R736G	40AA3141	R,CHIP 47H 5% 1/10W
R736R	40AA3143	R,CHIP 56H 5% 1/10W
R738	40AA3169	R,CHIP 680H 5% 1/10W
R739	40AA3181	R,CHIP 2.2K 5% 1/10W
R73A	40AA3173	R,CHIP 1.0K 5% 1/10W
R73E	40AB3191	R,CHIP 5.6K 1% 1/10W
R73F	40AB3183	R,CHIP 2.7K 1% 1/10W
R73G	40AB3205	R,CHIP 22K 1% 1/10W
R73H	40AA3173	R,CHIP 1.0K 5% 1/10W
R73J	40AB3191	R,CHIP 5.6K 1% 1/10W
R73K	40AB3183	R,CHIP 2.7K 1% 1/10W
R73WB	40AA3137	R,CHIP 33H 5% 1/10W
R73WG	40AA3137	R,CHIP 33H 5% 1/10W
R73WR	40AA3137	R,CHIP 33H 5% 1/10W
R73XB	40AA3137	R,CHIP 33H 5% 1/10W
R73XG	40AA3137	R,CHIP 33H 5% 1/10W
R73XR	40AA3137	R,CHIP 33H 5% 1/10W
R741B	401K5737	R,CARBON 470K 5% 1/6W
R741G	401K5737	R,CARBON 470K 5% 1/6W
R741R	401K5737	R,CARBON 470K 5% 1/6W

SYMBOL	PART NO	DESCRIPTION
R742B	40AAD213	R,CHIP 47K 5% 1/2W
R742G	40AAD213	R,CHIP 47K 5% 1/2W
R742R	40AAD213	R,CHIP 47K 5% 1/2W
R743B	40AB3233	R,CHIP 330K 1% 1/10W
R743G	40AB3233	R,CHIP 330K 1% 1/10W
R743R	40AB3233	R,CHIP 330K 1% 1/10W
R744B	40AB3227	R,CHIP 180K 1% 1/10W
R744G	40AB3227	R,CHIP 180K 1% 1/10W
R744R	40AB3227	R,CHIP 180K 1% 1/10W
R745B	40AA3157	R,CHIP 220H 5% 1/10W
R745G	40AA3157	R,CHIP 220H 5% 1/10W
R745R	40AA3157	R,CHIP 220H 5% 1/10W
R746B	40AB3221	R,CHIP 100K 1% 1/10W
R746G	40AB3221	R,CHIP 100K 1% 1/10W
R746R	40AB3221	R,CHIP 100K 1% 1/10W
R747B	40AA3197	R,CHIP 10K 5% 1/10W
R747G	40AA3197	R,CHIP 10K 5% 1/10W
R747R	40AA3197	R,CHIP 10K 5% 1/10W
R748B	40AA3185	R,CHIP 3.3K 5% 1/10W
R748G	40AA3185	R,CHIP 3.3K 5% 1/10W
R748R	40AA3185	R,CHIP 3.3K 5% 1/10W
R749B	40AB3219	R,CHIP 82K 1% 1/10W
R749G	40AB3219	R,CHIP 82K 1% 1/10W
R749R	40AB3219	R,CHIP 82K 1% 1/10W
R74AB	40AB3205	R,CHIP 22K 1% 1/10W
R74AG	40AB3205	R,CHIP 22K 1% 1/10W
R74AR	40AB3205	R,CHIP 22K 1% 1/10W
R74EB	40AB3211	R,CHIP 39K 1% 1/10W
R74EG	40AB3211	R,CHIP 39K 1% 1/10W
R74ER	40AB3211	R,CHIP 39K 1% 1/10W
R74FB	40AB3222	R,CHIP 110K 1% 1/10W
R74FG	40AB3222	R,CHIP 110K 1% 1/10W
R74FR	40AB3222	R,CHIP 110K 1% 1/10W
R74GB	40AAD213	R,CHIP 47K 5% 1/2W
R74GG	40AAD213	R,CHIP 47K 5% 1/2W
R74GR	40AAD213	R,CHIP 47K 5% 1/2W
R751	40AA3173	R,CHIP 1.0K 5% 1/10W
R752	40AA3149	R,CHIP 100H 5% 1/10W
R753	40AA3149	R,CHIP 100H 5% 1/10W
R771	40AA3197	R,CHIP 10K 5% 1/10W
R772	40AA3193	R,CHIP 6.8K 5% 1/10W
R773	40AA3173	R,CHIP 1.0K 5% 1/10W
R774	40AA3169	R,CHIP 680H 5% 1/10W
R775	40AA3195	R,CHIP 8.2K 5% 1/10W
R781	40AA3167	R,CHIP 560H 5% 1/10W
R782	40AA3209	R,CHIP 33K 5% 1/10W
R783	40AA1245	R,CHIP 1.0M 5% 1/8W
R784	40AA3231	R,CHIP 270K 5% 1/10W

SYMBOL	PART NO	DESCRIPTION
R785	40AA3242	R,CHIP 750K 5% 1/10W
R786	40AA3242	R,CHIP 750K 5% 1/10W
R787	40AA3233	R,CHIP 330K 5% 1/10W
R791	40AB3173	R,CHIP 1.0K 1% 1/10W
R792	40AA3149	R,CHIP 100H 5% 1/10W
R793	40AA3149	R,CHIP 100H 5% 1/10W
R794	40AA3157	R,CHIP 220H 5% 1/10W
R795B	40AA3157	R,CHIP 220H 5% 1/10W
R795G	40AA3157	R,CHIP 220H 5% 1/10W
R795R	40AA3157	R,CHIP 220H 5% 1/10W
R79A	40AA3181	R,CHIP 2.2K 5% 1/10W
R79E	40AA3197	R,CHIP 10K 5% 1/10W
R79F	40AA3187	R,CHIP 3.9K 5% 1/10W
R79G	40AA3173	R,CHIP 1.0K 5% 1/10W
R79H	40AA3197	R,CHIP 10K 5% 1/10W
R79K	40AA3213	R,CHIP 47K 5% 1/10W
R79L	40AA3189	R,CHIP 4.7K 5% 1/10W
R79M	40AA3197	R,CHIP 10K 5% 1/10W
R79N	40AA3205	R,CHIP 22K 5% 1/10W
R79P	40AA3213	R,CHIP 47K 5% 1/10W
R79R	40AA3213	R,CHIP 47K 5% 1/10W
R79T	40AA3197	R,CHIP 10K 5% 1/10W
R79U	40AA3197	R,CHIP 10K 5% 1/10W
R79W	40AA3181	R,CHIP 2.2K 5% 1/10W
R7A1	40AA3173	R,CHIP 1.0K 5% 1/10W
R7A2	40AB3187	R,CHIP 3.9K 1% 1/10W
R7A3	40AB3181	R,CHIP 2.2K 1% 1/10W
R7A7	40AA3173	R,CHIP 1.0K 5% 1/10W
R7A8	40AA3169	R,CHIP 680H 5% 1/10W
R7A9	40AA3212	R,CHIP 43K 5% 1/10W
R7AG	40AB3214	R,CHIP 51K 1% 1/10W
R7AH	40AA3169	R,CHIP 680H 5% 1/10W
R7AK	40AA3169	R,CHIP 680H 5% 1/10W
R7AL	40AA3159	R,CHIP 270H 5% 1/10W
R7AM	40AA3159	R,CHIP 270H 5% 1/10W
R7E2	40AA2167	R,CHIP 560H 5% 1/4W
R7E3	40AA3181	R,CHIP 2.2K 5% 1/10W
R7E4	40372169	R,METAL 680H 5% 2W
R7E5	404K5125	R,METAL 10H 5% 1/4W
R7E6	40AA2189	R,CHIP 4.7K 5% 1/4W
R7E7	40AA2195	R,CHIP 8.2K 5% 1/4W
R7F1	40AA3000	R,CHIP 0.0H 5% 1/10W
R7F2	40AA3177	R,CHIP 1.5K 5% 1/10W
R7F5	40371103	R,METAL 1.2H 5% 1W
R7G1	40AA3185	R,CHIP 3.3K 5% 1/10W
R7G2	40AA3185	R,CHIP 3.3K 5% 1/10W
R7G3	40AA3209	R,CHIP 33K 5% 1/10W
R7G4	40AA3209	R,CHIP 33K 5% 1/10W

SYMBOL	PART NO	DESCRIPTION
R7G6	40AB3229	R,CHIP 220K 1% 1/10W
R7G7	40AA3221	R,CHIP 100K 5% 1/10W
R7G8	40AA3199	R,CHIP 12K 5% 1/10W
R7G9	40AB3185	R,CHIP 3.3K 1% 1/10W
R7GA	40AA3209	R,CHIP 33K 5% 1/10W
R7GE	40AA3209	R,CHIP 33K 5% 1/10W
R7GF	40AA3185	R,CHIP 3.3K 5% 1/10W
R7GG	40AA3181	R,CHIP 2.2K 5% 1/10W
R7GH	40AA3227	R,CHIP 180K 5% 1/10W
R7GJ	40AA3199	R,CHIP 12K 5% 1/10W
R7GK	40AB3229	R,CHIP 220K 1% 1/10W
R7GL	40AB3185	R,CHIP 3.3K 1% 1/10W
R7GM	40AA3199	R,CHIP 12K 5% 1/10W
R7GN	40AA3221	R,CHIP 100K 5% 1/10W
R7GP	40AA3209	R,CHIP 33K 5% 1/10W
R7GR	40AA3209	R,CHIP 33K 5% 1/10W
R7GT	40AA3185	R,CHIP 3.3K 5% 1/10W
R7GW	40AA3181	R,CHIP 2.2K 5% 1/10W
R7GX	40AA3227	R,CHIP 180K 5% 1/10W
R7GY	40AA3199	R,CHIP 12K 5% 1/10W
R7K1	40AA3192	R,CHIP 6.2K 5% 1/10W
R7K2	40AAD211	R,CHIP 39K 5% 1/2W
R7K3	40AA3197	R,CHIP 10K 5% 1/10W
R7K4	40AA3000	R,CHIP 0.0H 5% 1/10W
R7K5	40AA3197	R,CHIP 10K 5% 1/10W
R7Y1	40AA3233	R,CHIP 330K 5% 1/10W
R7Y2	40AA3161	R,CHIP 330H 5% 1/10W
R7Y3	40AA3185	R,CHIP 3.3K 5% 1/10W
R7Y4	40AA3233	R,CHIP 330K 5% 1/10W
R7Y5	40AA3161	R,CHIP 330H 5% 1/10W
R7Y6	40AA3185	R,CHIP 3.3K 5% 1/10W
R7Y7	40AA3233	R,CHIP 330K 5% 1/10W
R7Y8	40AA3161	R,CHIP 330H 5% 1/10W
R7Y9	40AA3185	R,CHIP 3.3K 5% 1/10W
R7YA	40AA3233	R,CHIP 330K 5% 1/10W
R7YE	40AA3161	R,CHIP 330H 5% 1/10W
R7YF	40AA3185	R,CHIP 3.3K 5% 1/10W
R801	40AA3179	R,CHIP 1.8K 5% 1/10W
R802	40AA3179	R,CHIP 1.8K 5% 1/10W
R803	40AA3000	R,CHIP 0.0H 5% 1/10W
R804	40AA3000	R,CHIP 0.0H 5% 1/10W
R805	40AA3000	R,CHIP 0.0H 5% 1/10W
R806	40AA3000	R,CHIP 0.0H 5% 1/10W
R807	40AA3000	R,CHIP 0.0H 5% 1/10W
R808	40AA3000	R,CHIP 0.0H 5% 1/10W
R809	40AA3000	R,CHIP 0.0H 5% 1/10W
R80A	40AA3173	R,CHIP 1.0K 5% 1/10W
R80E	40AA3000	R,CHIP 0.0H 5% 1/10W

SYMBOL	PART NO	DESCRIPTION
R80F	40AA3000	R,CHIP 0.0H 5% 1/10W
R80H	40AA3000	R,CHIP 0.0H 5% 1/10W
R80J	40AA3173	R,CHIP 1.0K 5% 1/10W
R80K	40AA3173	R,CHIP 1.0K 5% 1/10W
R810	40AA3173	R,CHIP 1.0K 5% 1/10W
R811	40AA3173	R,CHIP 1.0K 5% 1/10W
R812	40AA3000	R,CHIP 0.0H 5% 1/10W
R813	40AA3125	R,CHIP 10H 5% 1/10W
R814	40AA3125	R,CHIP 10H 5% 1/10W
R815	40AA3125	R,CHIP 10H 5% 1/10W
R818	40AA3173	R,CHIP 1.0K 5% 1/10W
R819	40AA3173	R,CHIP 1.0K 5% 1/10W
R821	40AA3000	R,CHIP 0.0H 5% 1/10W
R822	40AA3173	R,CHIP 1.0K 5% 1/10W
R823	40AA3207	R,CHIP 27K 5% 1/10W
R826	40AA3205	R,CHIP 22K 5% 1/10W
R827	40AA3000	R,CHIP 0.0H 5% 1/10W
R82A	40AA3000	R,CHIP 0.0H 5% 1/10W
R831	40AA3173	R,CHIP 1.0K 5% 1/10W
R832	40AA3189	R,CHIP 4.7K 5% 1/10W
R852	40AA3177	R,CHIP 1.5K 5% 1/10W
R855	40AA3209	R,CHIP 33K 5% 1/10W
R857	40AA3209	R,CHIP 33K 5% 1/10W
R859	40AA3221	R,CHIP 100K 5% 1/10W
R85A	40AA3167	R,CHIP 560H 5% 1/10W
R85E	40AA3000	R,CHIP 0.0H 5% 1/10W
R85F	40AA3000	R,CHIP 0.0H 5% 1/10W
R85H	40AAD149	R,CHIP 100H 5% 1/2W
R85K	40AB3203	R,CHIP 18K 1% 1/10W
R85L	40AB3215	R,CHIP 56K 1% 1/10W
R85M	40AA3000	R,CHIP 0.0H 5% 1/10W
R85N	40AA3173	R,CHIP 1.0K 5% 1/10W
R8A1	40AA3207	R,CHIP 27K 5% 1/10W
R8A2	40AAD146	R,CHIP 75H 5% 1/2W
R8A3	40AA3213	R,CHIP 47K 5% 1/10W
R8A4	40AAD146	R,CHIP 75H 5% 1/2W
R8A5	40AA3197	R,CHIP 10K 5% 1/10W
R8A6	40AA3197	R,CHIP 10K 5% 1/10W
R8A7	40AA3197	R,CHIP 10K 5% 1/10W
R8A8	40AA3213	R,CHIP 47K 5% 1/10W
R8A9	40AAD151	R,CHIP 120H 5% 1/2W
R8AA	40AA3209	R,CHIP 33K 5% 1/10W
R8AE	40AA3173	R,CHIP 1.0K 5% 1/10W
R8AF	40AA3173	R,CHIP 1.0K 5% 1/10W
R8AH	40AA3209	R,CHIP 33K 5% 1/10W
R8AJ	40AA3179	R,CHIP 1.8K 5% 1/10W
R8GE	40372113	R,METAL 3.3H 5% 2W
R8M1B	40AA3161	R,CHIP 330H 5% 1/10W

SYMBOL	PART NO	DESCRIPTION
R8M1G	40AA3161	R,CHIP 330H 5% 1/10W
R8M1R	40AA3161	R,CHIP 330H 5% 1/10W
R8M2B	40AA2177	R,CHIP 1.5K 5% 1/4W
R8M2G	40AA2177	R,CHIP 1.5K 5% 1/4W
R8M2R	40AA2177	R,CHIP 1.5K 5% 1/4W
R8M4B	40AA3153	R,CHIP 150H 5% 1/10W
R8M4G	40AA3153	R,CHIP 150H 5% 1/10W
R8M4R	40AA3153	R,CHIP 150H 5% 1/10W
R8M5	40AA3149	R,CHIP 100H 5% 1/10W
R8M6	40AA3149	R,CHIP 100H 5% 1/10W
R8M7	40AA3149	R,CHIP 100H 5% 1/10W
R8M8	40AA3149	R,CHIP 100H 5% 1/10W
R8M9	40AA3149	R,CHIP 100H 5% 1/10W
R8MA	40AA3245	R,CHIP 1.0M 5% 1/10W
R8MC	40AB3179	R,CHIP 1.8K 1% 1/10W
R8ME	40AB3200	R,CHIP 13K 1% 1/10W
R8MFB	40AA2161	R,CHIP 330H 5% 1/4W
R8MFG	40AA2161	R,CHIP 330H 5% 1/4W
R8MFR	40AA2161	R,CHIP 330H 5% 1/4W
R8MH	40AA3173	R,CHIP 1.0K 5% 1/10W
R8N2	40AB3164	R,CHIP 430H 1% 1/10W
R8N3	40AB3212	R,CHIP 43K 1% 1/10W
R8N4	40AB3189	R,CHIP 4.7K 1% 1/10W
R8NT	40AA3173	R,CHIP 1.0K 5% 1/10W
R8NW	40AA3000	R,CHIP 0.0H 5% 1/10W
R8NX	40AA3000	R,CHIP 0.0H 5% 1/10W
R8P2	40AB3163	R,CHIP 390H 1% 1/10W
R8P3	40AB3215	R,CHIP 56K 1% 1/10W
R8P4	40AB3189	R,CHIP 4.7K 1% 1/10W
R8P5	40AB3169	R,CHIP 680H 1% 1/10W
R8P6	40AB3154	R,CHIP 160H 1% 1/10W
R8P8	40AA3185	R,CHIP 3.3K 5% 1/10W
R8P9	40AA3185	R,CHIP 3.3K 5% 1/10W
R8PA	40371105	R,METAL 1.5H 5% 1W
R8PE	40371157	R,METAL 220H 5% 1W
R8PG	40AB3171	R,CHIP 820H 1% 1/10W
R8PH	40AB3154	R,CHIP 160H 1% 1/10W
R8PM	40AA3185	R,CHIP 3.3K 5% 1/10W
R8PN	40AA3185	R,CHIP 3.3K 5% 1/10W
R8PP	40371157	R,METAL 220H 5% 1W
R8PR	40371105	R,METAL 1.5H 5% 1W
R8PT	40AA3173	R,CHIP 1.0K 5% 1/10W
R8R1	40AA3207	R,CHIP 27K 5% 1/10W
R8R2	40AA3197	R,CHIP 10K 5% 1/10W
R8R5	40AA3147	R,CHIP 82H 5% 1/10W
R8R6	40AA3000	R,CHIP 0.0H 5% 1/10W
R8R7	40AA3147	R,CHIP 82H 5% 1/10W
R8R8	40AA3000	R,CHIP 0.0H 5% 1/10W

SYMBOL	PART NO	DESCRIPTION
R8U1	40AA3137	R,CHIP 33H 5% 1/10W
R8U2	40AA3137	R,CHIP 33H 5% 1/10W
R8U3	40AA3185	R,CHIP 3.3K 5% 1/10W
R8U4	40AA3181	R,CHIP 2.2K 5% 1/10W
R8U5	40AA3197	R,CHIP 10K 5% 1/10W
R8U6	40AA3197	R,CHIP 10K 5% 1/10W
R8U7	40AA3197	R,CHIP 10K 5% 1/10W
R8U8	40AA3197	R,CHIP 10K 5% 1/10W
R8U9	40AA3197	R,CHIP 10K 5% 1/10W
R8UA	40AA3197	R,CHIP 10K 5% 1/10W
R8UF	40AA3173	R,CHIP 1.0K 5% 1/10W
R8UG	40AA3149	R,CHIP 100H 5% 1/10W
R8UH	40AA3149	R,CHIP 100H 5% 1/10W
R8W3	40AA3137	R,CHIP 33H 5% 1/10W
R8W4	40AA3137	R,CHIP 33H 5% 1/10W
R8W5	40AA3177	R,CHIP 1.5K 5% 1/10W
R8W6	40AA3177	R,CHIP 1.5K 5% 1/10W
R8W7	40AA3177	R,CHIP 1.5K 5% 1/10W
R8W8	40AA3177	R,CHIP 1.5K 5% 1/10W
R8W9	40AA3177	R,CHIP 1.5K 5% 1/10W
R8WA	40AA3177	R,CHIP 1.5K 5% 1/10W
R8WE	40AA3177	R,CHIP 1.5K 5% 1/10W
R8WF	40AA3177	R,CHIP 1.5K 5% 1/10W
R8X3	40AA3000	R,CHIP 0.0H 5% 1/10W
R8X4	40AA3000	R,CHIP 0.0H 5% 1/10W
R901B	40AA3149	R,CHIP 100H 5% 1/10W
R901G	40AA3149	R,CHIP 100H 5% 1/10W
R901R	40AA3149	R,CHIP 100H 5% 1/10W
R902B	401C6629	R,CARBON 15H 5% 1/4W
R902G	401C6629	R,CARBON 15H 5% 1/4W
R902R	401C6629	R,CARBON 15H 5% 1/4W
R903	401C6649	R,CARBON 100H 5% 1/4W
R904	40AAD133	R,CHIP 22H 5% 1/2W
R905	401C6689	R,CARBON 4.7K 5% 1/4W
R951	40AA3197	R,CHIP 10K 5% 1/10W
R952	40AA3173	R,CHIP 1.0K 5% 1/10W
R953	40AA3173	R,CHIP 1.0K 5% 1/10W
R983	40499449	R,METAL 10K 2% 1W
R984	40AB1171	R,CHIP 820H 1% 1/8W
R985	401G6141	R,CARBON 47H 5% 1/4W
R986	401G6141	R,CARBON 47H 5% 1/4W
R989	404J9477	R,METAL 68H 5% 2W
R990	40AA3233	R,CHIP 330K 5% 1/10W
R991	40372215	R,METAL 56K 5% 2W
R992	40AB3169	R,CHIP 680H 1% 1/10W
R993	40AA5193	R,CHIP 6.8K 5% 1/4W
R994	404K5125	R,METAL 10H 5% 1/4W
R995	401H5677	R,CARBON 1.5K 5% 1/2W

SYMBOL	PART NO	DESCRIPTION
*** CAPACITORS ***		
C151	42AA2744	C,CERAMIC 25V 0.1UF
C153	42AA2744	C,CERAMIC 25V 0.1UF
C2001	430C8715	C,ELEC 50V 22UF
C2002	430C8519	C,ELEC 25V 100UF
C401	430C8722	C,ELEC 50V 330UF
C402	42AA2744	C,CERAMIC 25V 0.1UF
C403	430C8721	C,ELEC 50V 220UF
C404	430C8721	C,ELEC 50V 220UF
C405	430C8722	C,ELEC 50V 330UF
C406	42AA2744	C,CERAMIC 25V 0.1UF
C407	428D4417	C,METAL FILM 250V 0.22UF
C421	42AA2744	C,CERAMIC 25V 0.1UF
C422	42AA2744	C,CERAMIC 25V 0.1UF
C423	427A7066	C,FILM 100V 0.018UF 5%
C424	42CA1458	C,CERAMIC 50V 560PF
C425	42CA1446	C,CERAMIC 50V 180PF
C426	42CA1450	C,CERAMIC 50V 270PF
C427	430C8522	C,ELEC 25V 330UF
C428	430C8522	C,ELEC 25V 330UF
C429	42CA1424	C,CERAMIC 50V 22PF
C471	42AA2726	C,CERAMIC 50V 0.01UF
C472	430C8711	C,ELEC 50V 4.7UF
C473	430C8711	C,ELEC 50V 4.7UF
C481	430B9041	C,ELEC 25V 47UF
C482	42AA2744	C,CERAMIC 25V 0.1UF
C483	430C8423	C,ELEC 16V 470UF
C4H1	430B9041	C,ELEC 25V 47UF
C4H2	421D6009	C,CERAMIC 25V 0.1UF
C4H3	430C8711	C,ELEC 50V 4.7UF
C4H7	430C8711	C,ELEC 50V 4.7UF
C4J4	42AA2744	C,CERAMIC 25V 0.1UF
C4J6	42AA2744	C,CERAMIC 25V 0.1UF
C4J8	42AA2744	C,CERAMIC 25V 0.1UF
C4K1	42AA2744	C,CERAMIC 25V 0.1UF
C4K2	430B9044	C,ELEC 25V 330UF
C4K3	430B9044	C,ELEC 25V 330UF
C4K4	42AA2744	C,CERAMIC 25V 0.1UF
C4K5	42AA2744	C,CERAMIC 25V 0.1UF
C4P1	4309J248	C,ELEC 10V 3300UF
C502	430B9039	C,ELEC 25V 22UF
C503	42AA2744	C,CERAMIC 25V 0.1UF
C504	430B9039	C,ELEC 25V 22UF
C505	42AA2744	C,CERAMIC 25V 0.1UF
C506	42CA1472	C,CERAMIC 50V 2200PF
C507	430C8423	C,ELEC 16V 470UF
C508	433A7014	C,ELEC 16V 100UF

SYMBOL	PART NO	DESCRIPTION
C509	430B9041	C,ELEC 25V 47UF
C510	427F4669	C,FILM 50V 0.033UF
C511	430C8423	C,ELEC 16V 470UF
C512	42AA2744	C,CERAMIC 25V 0.1UF
C513	42AA1521	C,CHIP CERAMIC 50V 0.01UF
C514	42AA2744	C,CERAMIC 25V 0.1UF
C515	430C8419	C,ELEC 16V 100UF
C516	42AA2744	C,CERAMIC 25V 0.1UF
C517	430C8419	C,ELEC 16V 100UF
C518	42AA2744	C,CERAMIC 25V 0.1UF
C519	42AA2744	C,CERAMIC 25V 0.1UF
C51A	42AA2744	C,CERAMIC 25V 0.1UF
C520	42AA1521	C,CHIP CERAMIC 50V 0.01UF
C522	42AA1521	C,CHIP CERAMIC 50V 0.01UF
C523	42AA1521	C,CHIP CERAMIC 50V 0.01UF
C524	42AA2744	C,CERAMIC 25V 0.1UF
C52A	42AA2744	C,CERAMIC 25V 0.1UF
C52C	430B9041	C,ELEC 25V 47UF
C52E	42AA2744	C,CERAMIC 25V 0.1UF
C52G	42AA2744	C,CERAMIC 25V 0.1UF
C52J	430B9041	C,ELEC 25V 47UF
C52K	42AA2744	C,CERAMIC 25V 0.1UF
C52L	42AA2744	C,CERAMIC 25V 0.1UF
C52M	430B9041	C,ELEC 25V 47UF
C52N	42AA2744	C,CERAMIC 25V 0.1UF
C52P	430B9041	C,ELEC 25V 47UF
C52T	42AA2744	C,CERAMIC 25V 0.1UF
C532	42AA2744	C,CERAMIC 25V 0.1UF
C533	430C8417	C,ELEC 16V 47UF
C54A	42AA1535	C,CERAMIC 25V 0.047UF
C552	4303H527	C,ELEC 25V 2200UF
C554	420C9571	C,CERAMIC 500V 4700PF
C561	42818327	C,METAL 2.0KV 4600PF 3%
C562	433A7014	C,ELEC 16V 100UF
C56A	430C6582	C,ELEC 50V 10UF
C56C	430C6582	C,ELEC 50V 10UF
C56E	42AA2744	C,CERAMIC 25V 0.1UF
C571	42AA2744	C,CERAMIC 25V 0.1UF
C573	42816384	C,FILM 250V 0.62UF 5%
C574	42816381	C,FILM 250V 0.36UF 5%
C575	42816376	C,FILM 250V 0.11UF 5%
C576	42816357	C,FILM 250V 0.27UF 5%
C577	42816367	C,FILM 250V 1.5UF 5%
C578	42816364	C,FILM 250V 0.82UF 5%
C579	42816351	C,FILM 250V 0.10UF 5%
C57A	42816351	C,FILM 250V 0.10UF 5%
C57C	420C9066	C,CERAMIC 500V 1800PF
C57E	42AA1538	C,CERAMIC 25V 0.1UF

SYMBOL	PART NO	DESCRIPTION
C57F	42AA1538	C,CERAMIC 25V 0.1UF
C57H	42AA1538	C,CERAMIC 25V 0.1UF
C57J	42AA1538	C,CERAMIC 25V 0.1UF
C57K	42AA1538	C,CERAMIC 25V 0.1UF
C57M	42AA1538	C,CERAMIC 25V 0.1UF
C57N	430C6537	C,ELEC 16V 330UF
C57P	430C6582	C,ELEC 50V 10UF
C57R	42816349	C,FILM 250V 0.068UF 5%
C57T	430B6041	C,ELEC 25V 47UF
C57W	430F1113	C,ELEC 16V 100UF
C57X	42AA1538	C,CERAMIC 25V 0.1UF
C581	430C6520	C,ELEC 10V 220UF
C582	433A4026	C,ELEC 16V 100UF
C591	42AA2744	C,CERAMIC 25V 0.1UF
C592	430B9553	C,ELEC 250V 2.2UF
C593	420C9567	C,CERAMIC 500V 2200PF
C595	427F4617	C,FILM 50V 0.022UF
C596	430C6582	C,ELEC 50V 10UF
C597	430B6041	C,ELEC 25V 47UF
C598	42CA1454	C,CERAMIC 50V 390PF
C59C	42AA2744	C,CERAMIC 25V 0.1UF
C59E	42AA2744	C,CERAMIC 25V 0.1UF
C59F	430B6041	C,ELEC 25V 47UF
C59H	430C6551	C,ELEC 25V 100UF
C59L	430C6582	C,ELEC 50V 10UF
C5A1	42AA2744	C,CERAMIC 25V 0.1UF
C5A2	42AA2744	C,CERAMIC 25V 0.1UF
C5A3	433A7046	C,ELEC 50V 10UF
C5A4	427F4687	CQ93M1H151J,BT
C5A5	427F4621	C,FILM 50V 0.047UF
C5A6	4302J556	C,ELEC 250V 10UF
C5A7	428D0097	C,FILM 250V 0.22UF
C5A8	427F4625	C,FILM 50V 0.1UF
C5A9	430C6552	C,ELEC 25V 220UF
C5AC	430C6552	C,ELEC 25V 220UF
C5E1	430B9096	C,ELEC 100V 3.3UF
C5E2	428D0053	C,METAL 100V 0.1UF
C5E3	42CA1464	C,CERAMIC 50V 1000PF
C5F1	430B9016	C,ELEC 10V 100UF
C5F2	433A7002	C,ELEC 10V 47UF
C5F3	430B9016	C,ELEC 10V 100UF
C5F4	42AA2744	C,CERAMIC 25V 0.1UF
C5F5	42AA2744	C,CERAMIC 25V 0.1UF
C5G1	4309J236	C,ELEC 350V 33UF
C5G2	428D5093	C,METAL 250V 0.1UF
C5G3	4302J558	C,ELEC 250V 33UF
C5G5	428D5093	C,METAL 250V 0.1UF
C5GA	430C6584	C,ELEC 50V 33UF

SYMBOL	PART NO	DESCRIPTION
C5GE	42AA2726	C,CERAMIC 50V 0.01UF
C5GF	430B6028	C,ELEC 16V 47UF
C5GH	430C6581	C,ELEC 50V 4.7UF
C5GK	42AA2744	C,CERAMIC 25V 0.1UF
C5P1	430B9041	C,ELEC 25V 47UF
C5P2	42AA2744	C,CERAMIC 25V 0.1UF
C5R1	4309J196	C,ELEC 100V 120UF
C5R2	42898011	C,FILM 100V 2.2UF
C5R3	42826301	C,FILM 800V 1000PF
C5R4	42703464	C,FILM 630V 0.012UF
C5T2	427F4625	C,FILM 50V 0.1UF
C5U1	427F4625	C,FILM 50V 0.1UF
C5W2	42AA1538	C,CERAMIC 25V 0.1UF
C5W4	430B6062	C,ELEC 50V 2.2UF
C5W5	427F4617	C,FILM 50V 0.022UF
C5W6	42CA1452	C,CHIP 50V 330PF
C5W7	430B6028	C,ELEC 16V 47UF
C5W8	42AA2744	C,CERAMIC 25V 0.1UF
C5X1	430C8152	C,ELEC 160V 10UF
C5X2	430C6631	C,ELEC 160V 3.3UF
C5X3	42AA2726	C,CERAMIC 50V 0.01UF
C607	42AA2721	C,CERAMIC 50V 0.1UF
C608	42060330	C,CERAMIC 400V 2200PF
C609	43109896	C,ELEC 400V 330UF
C610	43109896	C,ELEC 400V 330UF
C611	428D0225	C,METAL 630V 0.022UF
C621	430C9502	C,ELEC 35V 220UF
C622	42899196	C,METAL 1.25KV 1000PF 3%
C623	430C9502	C,ELEC 35V 220UF
C624	430C8152	C,ELEC 160V 10UF
C625	42CA1456	C,CERAMIC 50V 470PF
C651	430B9066	C,ELEC 50V 22UF
C652	42AA2721	C,CERAMIC 50V 0.1UF
C653	430B9041	C,ELEC 25V 47UF
C654	42AA2721	C,CERAMIC 50V 0.1UF
C655	420J8061	C,CERAMIC 560PF 1KV10%-AT
C656	420J8052	C,CERAMIC 100PF1KV10%,AT
C658	430B6068	C,ELEC 50V 47UF
C659	427F4625	C,FILM 50V 0.1UF
C660	428D0081	C,METAL 250V 0.01UF
C671	430C9503	C,ELEC 100V 47UF
C672	428D6011	C,METAL 100V 0.15UF
C673	428D6009	C,METAL 100V 0.1UF
C674	430C6614	C,ELEC 100V 1UF
C6A1	43099262	C,ELEC 300V 220UF
C6A2	43036674	C,ELEC 315V 22UF
C6E1	4302J104	C,ELEC 100V 330UF
C6E2	4302F102	C,ELEC 100V 100UF

SYMBOL	PART NO	DESCRIPTION
C6E3	4302J104	C,ELEC 100V 330UF
C6F1	4302J047	C,ELEC 25V 2200UF
C6F2	4302J047	C,ELEC 25V 2200UF
C6F3	430C6554	C,ELEC 25V 470UF
C6G2	4302J047	C,ELEC 25V 2200UF
C6H1	4302J047	C,ELEC 25V 2200UF
C6H2	430C6554	C,ELEC 25V 470UF
C6K1	430B9020	C,ELEC 10V 1000UF
C6K2	430C6535	C,ELEC 16V 100UF
C6L1	430CH627	C,ELEC 35V 2200UF
C6L2	430B6056	C,ELEC 35V 330UF
C6L4	420J8061	C,CERAMIC 560PF 1KV10%-AT
C6M1	430CH627	C,ELEC 35V 2200UF
C6M2	430B6056	C,ELEC 35V 330UF
C6M4	420J8061	C,CERAMIC 560PF 1KV10%-AT
C6P1	430C6601	C,ELEC 63V 10UF
C6P2	421C3479	C,CERAMIC 50V 0.1UF
C6T1	42826201	C,FILM 250V 0.1UF
C6T2	420EJ013	C,CERAMIC 400V 1000PF
C6T3	420EJ013	C,CERAMIC 400V 1000PF
C6T4	42826201	C,FILM 250V 0.1UF
C6V1	430C8523	C,ELEC 25V 470UF
C6V2	421C3479	C,CERAMIC 50V 0.1UF
C6V3	421C3479	C,CERAMIC 50V 0.1UF
C6V4	421C3479	C,CERAMIC 50V 0.1UF
C6Y1	42845181	C,FILM 400V 0.47UF
C6Y2	42839865	C,METAL FILM 400V 0.47UF
C701B	433A6148	C,ELEC 16V 100UF
C701G	433A6148	C,ELEC 16V 100UF
C701R	433A6148	C,ELEC 16V 100UF
C702B	42AA2726	C,CERAMIC 50V 0.01UF
C702G	42AA2726	C,CERAMIC 50V 0.01UF
C702R	42AA2726	C,CERAMIC 50V 0.01UF
C703B	433A6148	C,ELEC 16V 100UF
C703G	433A6148	C,ELEC 16V 100UF
C703R	433A6148	C,ELEC 16V 100UF
C704B	42AA2726	C,CERAMIC 50V 0.01UF
C704G	42AA2726	C,CERAMIC 50V 0.01UF
C704R	42AA2726	C,CERAMIC 50V 0.01UF
C705	428B3513	C,METAL FILM 50V 0.1UF
C706	433A6143	C,ELEC 16V 10UF
C707	428B3513	C,METAL FILM 50V 0.1UF
C708	433A6143	C,ELEC 16V 10UF
C709	430B8144	C,ELEC 16V 47UF
C711B	433A6180	C,ELEC 50V 3.3UF
C711G	433A6180	C,ELEC 50V 3.3UF
C711R	433A6180	C,ELEC 50V 3.3UF
C712B	42AA2726	C,CERAMIC 50V 0.01UF

SYMBOL	PART NO	DESCRIPTION
C712G	42AA2726	C,CERAMIC 50V 0.01UF
C712R	42AA2726	C,CERAMIC 50V 0.01UF
C713B	430J9184	C,ELEC 16V 100UF
C713G	430J9184	C,ELEC 16V 100UF
C713R	430J9184	C,ELEC 16V 100UF
C714B	42AA2744	C,CERAMIC 25V 0.1UF
C714G	42AA2744	C,CERAMIC 25V 0.1UF
C714R	42AA2744	C,CERAMIC 25V 0.1UF
C715	430C6537	C,ELEC 16V 330UF
C716	42AA2744	C,CERAMIC 25V 0.1UF
C717	430C0244	C,ELEC 16V 47UF
C718	42AA2744	C,CERAMIC 25V 0.1UF
C71AB	42AA2744	C,CERAMIC 25V 0.1UF
C71AG	42AA2744	C,CERAMIC 25V 0.1UF
C71AR	42AA2744	C,CERAMIC 25V 0.1UF
C71E	42AA2744	C,CERAMIC 25V 0.1UF
C71FB	430C8417	C,ELEC 16V 47UF
C71FG	430C8417	C,ELEC 16V 47UF
C71FR	430C8417	C,ELEC 16V 47UF
C721B	42AA1538	C,CERAMIC 25V 0.1UF
C721G	42AA1538	C,CERAMIC 25V 0.1UF
C721R	42AA1538	C,CERAMIC 25V 0.1UF
C722B	42CA1448	C,CERAMIC 50V 220PF
C722G	42CA1448	C,CERAMIC 50V 220PF
C722R	42CA1448	C,CERAMIC 50V 220PF
C723B	42CA1426	C,CERAMIC 50V 27PF
C723G	42CA1426	C,CERAMIC 50V 27PF
C723R	42CA1426	C,CERAMIC 50V 27PF
C724	42AA2744	C,CERAMIC 25V 0.1UF
C725	42AA2744	C,CERAMIC 25V 0.1UF
C726	430C8421	C,ELEC 16V 220UF
C727	428C9002	C,METAL FILM 100V 0.1UF
C728	430C6621	C,ELEC 100V 47UF
C729B	428D0097	C,FILM 250V 0.22UF
C729G	428D0097	C,FILM 250V 0.22UF
C729R	428D0097	C,FILM 250V 0.22UF
C72AB	42CA1430	C,CERAMIC 50V 39PF
C72AG	42CA1430	C,CERAMIC 50V 39PF
C72AR	42CA1430	C,CERAMIC 50V 39PF
C72EB	42CA1438	C,CERAMIC 50V 82PF
C72EG	42CA1438	C,CERAMIC 50V 82PF
C72ER	42CA1438	C,CERAMIC 50V 82PF
C72F	42AA2744	C,CERAMIC 25V 0.1UF
C731	430C0244	C,ELEC 16V 47UF
C731A	42AA2744	C,CERAMIC 25V 0.1UF
C732B	42AA2744	C,CERAMIC 25V 0.1UF
C732G	42AA2744	C,CERAMIC 25V 0.1UF
C732R	42AA2744	C,CERAMIC 25V 0.1UF

SYMBOL	PART NO	DESCRIPTION
C733B	42AA2744	C,CERAMIC 25V 0.1UF
C733G	42AA2744	C,CERAMIC 25V 0.1UF
C733R	42AA2744	C,CERAMIC 25V 0.1UF
C735	430J9184	C,ELEC 16V 100UF
C735A	42AA2744	C,CERAMIC 25V 0.1UF
C735E	42AA2744	C,CERAMIC 25V 0.1UF
C738	42AA2744	C,CERAMIC 25V 0.1UF
C739	42AA2744	C,CERAMIC 25V 0.1UF
C73A	430C0244	C,ELEC 16V 47UF
C73E	42AA2744	C,CERAMIC 25V 0.1UF
C73F	430B8179	C,ELEC 50V 10UF
C73H	430B8179	C,ELEC 50V 10UF
C741B	430B9552	C,ELEC 250V 1.0UF
C741G	430B9552	C,ELEC 250V 1.0UF
C741R	430B9552	C,ELEC 250V 1.0UF
C742B	42AA1521	C,CHIP CERAMIC 50V 0.01UF
C742G	42AA1521	C,CHIP CERAMIC 50V 0.01UF
C742R	42AA1521	C,CHIP CERAMIC 50V 0.01UF
C743B	428D0093	C,METALFILM 250V 0.1UF
C743G	428D0093	C,METALFILM 250V 0.1UF
C743R	428D0093	C,METALFILM 250V 0.1UF
C744B	427F4673	C,FILM 50V 0.068UF
C744G	427F4673	C,FILM 50V 0.068UF
C744R	427F4673	C,FILM 50V 0.068UF
C747	430C8355	C,ELEC 250V 10UF
C748	42AA2744	C,CERAMIC 25V 0.1UF
C751	42AA2744	C,CERAMIC 25V 0.1UF
C752	42AA2744	C,CERAMIC 25V 0.1UF
C764	430C8419	C,ELEC 16V 100UF
C765	430C6536	C,ELEC 16V 220UF
C766	430C6535	C,ELEC 16V 100UF
C771	427F4675	C,FILM 50V 0.1UF
C772	430C6534	C,ELEC 16V 47UF
C773	430C8417	C,ELEC 16V 47UF
C781	430B6028	C,ELEC 16V 47UF
C783	430B9552	C,ELEC 250V 1.0UF
C791	42AA1505	C,CHIP CERAMIC 50V 470PF
C792	42AA1538	C,CERAMIC 25V 0.1UF
C793	430C0275	C,ELEC 50V 1.0UF
C794	42AA2744	C,CERAMIC 25V 0.1UF
C795	430J9184	C,ELEC 16V 100UF
C796	430C6535	C,ELEC 16V 100UF
C797	42AA2744	C,CERAMIC 25V 0.1UF
C79A	42CA1444	C,CERAMIC 50V 150PF
C79E	42CA1438	C,CERAMIC 50V 82PF
C79G	42AA1515	C,CHIP CERAMIC 50V 3300PF
C79H	42AA1509	C,CHIP CERAMIC 50V 1000PF
C7A1	42AA2744	C,CERAMIC 25V 0.1UF

SYMBOL	PART NO	DESCRIPTION
C7A2	430C0278	C,ELEC 50V 4.7UF
C7A3	428B3511	C,METAL 50V 0.068UF
C7A4	430C0278	C,ELEC 50V 4.7UF
C7A5	430C0275	C,ELEC 50V 1.0UF
C7A8	42CA1448	C,CERAMIC 50V 220PF
C7A9	42AA2744	C,CERAMIC 25V 0.1UF
C7AA	430J9184	C,ELEC 16V 100UF
C7AE	42CA1440	C,CERAMIC 50V 100PF
C7AG	433A6520	C,ELEC 50V 1.0UF
C7E1	430C6586	C,ELEC 50V 100UF
C7E3	430C8417	C,ELEC 16V 47UF
C7E4	428D0097	C,FILM 250V 0.22UF
C7E7	430C6551	C,ELEC 25V 100UF
C7F1	430C8417	C,ELEC 16V 47UF
C7F2	42AA2744	C,CERAMIC 25V 0.1UF
C7F3	42AA2744	C,CERAMIC 25V 0.1UF
C7G1	42AA2744	C,CERAMIC 25V 0.1UF
C7G2	42AA1538	C,CERAMIC 25V 0.1UF
C7G3	42AA1538	C,CERAMIC 25V 0.1UF
C7G5	42AA2744	C,CERAMIC 25V 0.1UF
C7G6	42AA2744	C,CERAMIC 25V 0.1UF
C7GA	42CA1464	C,CERAMIC 50V 1000PF
C7GE	42AA2726	C,CERAMIC 50V 0.01UF
C7GF	42CA1436	C,CERAMIC 50V 68PF
C7GG	42CA1464	C,CERAMIC 50V 1000PF
C7GH	42AA2726	C,CERAMIC 50V 0.01UF
C7GJ	42CA1436	C,CERAMIC 50V 68PF
C7GK	42AA2744	C,CERAMIC 25V 0.1UF
C7K1	428D0081	C,METAL 250V 0.01UF
C801	42AA2744	C,CERAMIC 25V 0.1UF
C802	430C6535	C,ELEC 16V 100UF
C808	42CA1416	C,CERAMIC 50V 10PF
C809	42CA1416	C,CERAMIC 50V 10PF
C811	42AA2744	C,CERAMIC 25V 0.1UF
C814	42AA2744	C,CERAMIC 25V 0.1UF
C816	42AA1509	C,CHIP CERAMIC 50V 1000PF
C817	42AA1509	C,CHIP CERAMIC 50V 1000PF
C818	42AA1509	C,CHIP CERAMIC 50V 1000PF
C852	42CA1428	C,CERAMIC 50V 33PF
C853	42CA1428	C,CERAMIC 50V 33PF
C854	42AA2744	C,CERAMIC 25V 0.1UF
C855	430B8145	C,ELEC 16V 100UF
C857	42AA2744	C,CERAMIC 25V 0.1UF
C85A	430B8179	C,ELEC 50V 10UF
C85E	42AA2744	C,CERAMIC 25V 0.1UF
C8A1	42AA2744	C,CERAMIC 25V 0.1UF
C8A2	430B8144	C,ELEC 16V 47UF
C8G3	42AA2744	C,CERAMIC 25V 0.1UF

SYMBOL	PART NO	DESCRIPTION
C8G4	430C8417	C,ELEC 16V 47UF
C8G6	430B6028	C,ELEC 16V 47UF
C8G7	42AA2744	C,CERAMIC 25V 0.1UF
C8G8	42AA2744	C,CERAMIC 25V 0.1UF
C8G9	42AA2744	C,CERAMIC 25V 0.1UF
C8M1B	42AA2744	C,CERAMIC 25V 0.1UF
C8M1G	42AA2744	C,CERAMIC 25V 0.1UF
C8M1R	42AA2744	C,CERAMIC 25V 0.1UF
C8M2	42AA2744	C,CERAMIC 25V 0.1UF
C8M3	42AA2744	C,CERAMIC 25V 0.1UF
C8M4	42AA2744	C,CERAMIC 25V 0.1UF
C8M5	42CA1424	C,CERAMIC 50V 22PF
C8M6	42CA1424	C,CERAMIC 50V 22PF
C8M7	430B6028	C,ELEC 16V 47UF
C8M9	42AA2744	C,CERAMIC 25V 0.1UF
C8MA	430C8417	C,ELEC 16V 47UF
C8MF	430B6028	C,ELEC 16V 47UF
C8N9	42AA2744	C,CERAMIC 25V 0.1UF
C8P1	42CA1444	C,CERAMIC 50V 150PF
C8P2	42CA1444	C,CERAMIC 50V 150PF
C8P3	42AA2744	C,CERAMIC 25V 0.1UF
C8P4	42AA2744	C,CERAMIC 25V 0.1UF
C8P5	430B6042	C,ELEC 25V 100UF
C8P6	430B6042	C,ELEC 25V 100UF
C8P7	42AA2744	C,CERAMIC 25V 0.1UF
C8P8	42AA2744	C,CERAMIC 25V 0.1UF
C8P9	42AA2744	C,CERAMIC 25V 0.1UF
C8PA	42AG0520	C,CHIP 50V 8200PF
C8PC	42AG0520	C,CHIP 50V 8200PF
C8R1	430B9062	C,ELEC 50V 2.2UF
C8T3	42AA2744	C,CERAMIC 25V 0.1UF
C8T4	430B9064	C,ELEC 50V 4.7UF
C8T5	42AA2744	C,CERAMIC 25V 0.1UF
C8T6	430B9064	C,ELEC 50V 4.7UF
C8UE	42AA2744	C,CERAMIC 25V 0.1UF
C8W1	42CA1416	C,CERAMIC 50V 10PF
C8W2	42CA1416	C,CERAMIC 50V 10PF
C8W6	42AA2744	C,CERAMIC 25V 0.1UF
C8W7	42AA2744	C,CERAMIC 25V 0.1UF
C8W9	430B9028	C,ELEC 16V 47UF
C8WA	430B9065	C,ELEC 50V 10UF
C8X1	42AA2744	C,CERAMIC 25V 0.1UF
C8X2	42AA2744	C,CERAMIC 25V 0.1UF
C901	420C9557	C,CERAMIC 500V 330PF
C902	420C9551	C,CERAMIC 500V 100PF
C903	4204K108	C,CERAMIC 2KV 0.01UF
C904	420D0019	C,CERAMIC 2KV 1000PF
C905	42AA2744	C,CERAMIC 25V 0.1UF

SYMBOL	PART NO	DESCRIPTION
C958	433A4033	C,ELEC 25V 10UF
C959	42AA2726	C,CERAMIC 50V 0.01UF
C983	428D4317	C,METAL FILM 100V 0.22UF
C984	430C6621	C,ELEC 100V 47UF
C985	420C9563	C,CERAMIC 500V 1000PF
C986	430C6582	C,ELEC 50V 10UF
C987	430B9098	C,ELEC 100V 10 UF
C989	423E2111	C,CERAMIC 500V 10PF

REPLACEMENT PARTS LIST

The components specified for Model FP1370(B)

SYMBOL	PART NO	DESCRIPTION
*** CRT & TUNER ***		
CRT	33022503	CRT M51LRY22X61
*** ICS ***		
IC151	370EF040	IC LM45CIM3X
IC401	37006027	IC LA7876N
IC421	370E6178	IC BA14741F-E2
IC471	37005256	IC UPC7812AHF (REG)
IC481	370KE062	IC BA033FP-E2
IC4H3	37056616	IC BA10358
IC4J1	370AA092	IC BA4558F-E2(OP-AMP)
IC4L1	370AA067	IC BA10324AF-E2 (OP-AMP)
IC501	37R56288	MOS HE6-0092(JANGLE61882)
IC510	370E6178	IC BA14741F-E2
IC511	370E6178	IC BA14741F-E2
IC513	370EB067	IC UPC814G2-E2(OP-AMP)
IC532	370EF032	MOS M62392FP-D
IC571	37REH024	MOS M62320FP-D-T2
IC591	370AA067	IC BA10324AF-E2 (OP-AMP)
IC592	37076409	IC BA9757
IC5A1	370AA092	IC BA4558F-E2(OP-AMP)
IC5GA	370EF021	IC CA0007AM-T
IC5W1	370KJ003	IC BA9762F
IC621	37076406	IC STR-S6729A(LF953)
IC651	37005345	IC MIP0224SY
IC652	370A1009	IC UPC1093J-T (REG)
IC671	37076357	IC SE080N(LF12)
IC6V1	37011351	IC KIA393P (COMP)
IC711	37011401	IC M52742ASP
IC721	37011380	IC VPS16
IC731	37RAA021	IC M52755FP-D
IC742	370AA067	IC BA10324AF-E2 (OP-AMP)
IC751	370EF031	MOS M62393FP-D
IC791	37R56305	MOS M35070-050FP
IC7A1	370EF025	IC M52347FP
IC7F1	37076408	IC SI-3062FA
IC7G1	370EC058	MOS HD74HC123AFP-EL
IC801	37R56377	MOS UPD78018FYGC-R23-AB8
IC802	370EE004	MOS M24C16-MN6 T
IC851	37R56326	MOS LSC528223FU
IC854	370A1009	IC UPC1093J-T (REG)
IC8A1	370ED003	MOS 24LCS21AT/SN

SYMBOL	PART NO	DESCRIPTION
IC8G1	37005277	IC PQ05RR13 (REG)
IC8G2	37005349	IC PQ05RD08(REG)
IC8M1	37076420	MOS BU6483K(V_DETECT)
IC8M2	370KE062	IC BA033FP-E2
IC8P1	37011403	IC STK391-110
IC8P2	370EB067	IC UPC814G2-E2(OP-AMP)
IC8T1	370K5005	IC UPC78L15J-T
IC8T2	370K5006	IC UPC79L15J-T
IC8U1	37R56294	MOS UPD93299GD(D-CONV)
IC8U2	370E3438	MOS CY7C199-15VCT
IC8W2	370EB067	IC UPC814G2-E2(OP-AMP)

*** TRANSISTORS ***

CR601	35599006	TRIAC TM1061S-L
MQ571	35135002	TR SLA5070(FET ARRAY)
Q101	35AB0313	TR 2SA1037AK-T146 R
Q102	35AB0313	TR 2SA1037AK-T146 R
Q103	35EB0238	TR DTC114YKA-T146
Q104	35EB0238	TR DTC114YKA-T146
Q411	35KB2498	TR 2SK3018-T106
Q421	35KB2498	TR 2SK3018-T106
Q422	35KB2498	TR 2SK3018-T106
Q423	35KB2498	TR 2SK3018-T106
Q4J1	350J5602	TR 2SD1994A(TA)
Q4J2	350C2022	TR 2SB1322A(TA)
Q4K1	350J5602	TR 2SD1994A(TA)
Q4K2	350C2022	TR 2SB1322A(TA)
Q4L1	350J5602	TR 2SD1994A(TA)
Q4L2	350C2022	TR 2SB1322A(TA)
Q4M1	350J5602	TR 2SD1994A(TA)
Q4M2	350C2022	TR 2SB1322A(TA)
Q4N1	350J5602	TR 2SD1994A(TA)
Q4N2	350C2022	TR 2SB1322A(TA)
Q4P1	35AB0313	TR 2SA1037AK-T146 R
Q4P2	35KB2498	TR 2SK3018-T106
Q4P3	35AB0313	TR 2SA1037AK-T146 R
Q4P4	35KB2505	TR 2SK1103-Q(TX)
Q4R1	350J5602	TR 2SD1994A(TA)
Q4R2	350C2022	TR 2SB1322A(TA)
Q501	35CB1113	TR 2SC2412K-T146 R
Q502	35KB2498	TR 2SK3018-T106
Q503	35AB0313	TR 2SA1037AK-T146 R
Q504	35CB1113	TR 2SC2412K-T146 R
Q505	35CB1113	TR 2SC2412K-T146 R
Q553	35CB1113	TR 2SC2412K-T146 R
Q554	35AB0313	TR 2SA1037AK-T146 R
Q555	35128023	TR IRLS530A
Q561	35095411	TR 2SC5453

SYMBOL	PART NO	DESCRIPTION
Q571	35072612	TR 2SD2396 J
Q572	35128000	TR 2SK2522-01M
Q581	35072612	TR 2SD2396 J
Q5A1	35072720	TR 2SD1889
Q5E1	35CB1113	TR 2SC2412K-T146 R
Q5F1	35AB1596	TR 2SA1514K S-T
Q5F2	35EB0212	TR DTA114WKA-T146
Q5F3	35CB1113	TR 2SC2412K-T146 R
Q5F4	35EB0212	TR DTA114WKA-T146
Q5G1	35128034	TR 2SJ569LS
Q5R1	35128009	TR 2SK2645-01MR(F111)
Q5W1	35CB1113	TR 2SC2412K-T146 R
Q5W2	35AB0313	TR 2SA1037AK-T146 R
Q5X1	350K4112	TR 2SA916-T L
Q5X2	350K4112	TR 2SA916-T L
Q621	350E3218	TR 2SC1740S-T R
Q622	350J4817	TR 2SC1473A-TA Q
Q623	35095270	TR 2SC2317
Q624	35092400	TR 2SC3852A
Q625	35092400	TR 2SC3852A
Q651	35AB0011	TR 2SA812-T1B M5
Q652	35CB0012	TR 2SC1623-T1B L6
Q653	35AB0011	TR 2SA812-T1B M5
Q671	35030000	TR 2SB1626
Q672	350J5382	TR 2SC3478A-T K
Q673	35EB0230	TR DTC114EKA-T146
Q682	35CB0012	TR 2SC1623-T1B L6
Q6P1	350E3218	TR 2SC1740S-T R
Q6V1	350E3218	TR 2SC1740S-T R
Q711B	350H0200	TR 2SC2407A-T
Q711G	350H0200	TR 2SC2407A-T
Q711R	350H0200	TR 2SC2407A-T
Q722B	35KB2498	TR 2SK3018-T106
Q722G	35KB2498	TR 2SK3018-T106
Q722R	35KB2498	TR 2SK3018-T106
Q732	35AB0313	TR 2SA1037AK-T146 R
Q734	35EB0230	TR DTC114EKA-T146
Q735	35EB0230	TR DTC114EKA-T146
Q741B	350J5205	TR 2SC3415S-TP
Q741G	350J5205	TR 2SC3415S-TP
Q741R	350J5205	TR 2SC3415S-TP
Q771	35AB0313	TR 2SA1037AK-T146 R
Q772	35CB1113	TR 2SC2412K-T146 R
Q781	350J5205	TR 2SC3415S-TP
Q791	35CB2385	TR 2SC3735-T1B B34
Q792	35CB2385	TR 2SC3735-T1B B34
Q793	35CB1113	TR 2SC2412K-T146 R
Q794	35EB0232	TR DTC144EKA-T146(0°)

SYMBOL	PART NO	DESCRIPTION
Q795	35CB1113	TR 2SC2412K-T146 R
Q796	35CB2385	TR 2SC3735-T1B B34
Q797	35EB0230	TR DTC114EKA-T146
Q798	35EB0230	TR DTC114EKA-T146
Q7A1	35EB0232	TR DTC144EKA-T146(0°)
Q7A2	35CB1113	TR 2SC2412K-T146 R
Q7E1	35CB2393	TR 2SC3757 R-TX
Q7E2	35CB1113	TR 2SC2412K-T146 R
Q7E3	35AB0313	TR 2SA1037AK-T146 R
Q7G1	35CB1113	TR 2SC2412K-T146 R
Q7G2	35CB1113	TR 2SC2412K-T146 R
Q7G3	35CB1113	TR 2SC2412K-T146 R
Q7G4	35CB1113	TR 2SC2412K-T146 R
Q7G5	35CB1113	TR 2SC2412K-T146 R
Q7G6	35CB1113	TR 2SC2412K-T146 R
Q7K1	350K4112	TR 2SA916-T L
Q7K2	35EB0232	TR DTC144EKA-T146(0°)
Q7K3	35CB1113	TR 2SC2412K-T146 R
Q7Y1	35AB1592	TR 2SA1434-TB
Q7Y2	35CB2468	TR 2SC3624-T1B-L18
Q7Y3	35AB1592	TR 2SA1434-TB
Q7Y4	35CB2468	TR 2SC3624-T1B-L18
Q7Y5	35AB1592	TR 2SA1434-TB
Q7Y6	35CB2468	TR 2SC3624-T1B-L18
Q7Y7	35AB1592	TR 2SA1434-TB
Q7Y8	35CB2468	TR 2SC3624-T1B-L18
Q831	35EB0230	TR DTC114EKA-T146
Q832	35EB0230	TR DTC114EKA-T146
Q833	35EB0230	TR DTC114EKA-T146
Q834	35EB0230	TR DTC114EKA-T146
Q851	35AB0313	TR 2SA1037AK-T146 R
Q852	35EB0232	TR DTC144EKA-T146(0°)
Q8A1	35CB1113	TR 2SC2412K-T146 R
Q8A2	35EB0232	TR DTC144EKA-T146(0°+D256)
Q8A3	35CB1113	TR 2SC2412K-T146 R
Q8A4	35AB0313	TR 2SA1037AK-T146 R
Q8A5	35KB2498	TR 2SK3018-T106
Q8A6	35KB2498	TR 2SK3018-T106
Q8M1B	35CB2453	TR 2SC3772-3-TB
Q8M1G	35CB2453	TR 2SC3772-3-TB
Q8M1R	35CB2453	TR 2SC3772-3-TB
Q8R1	35CB0011	TR 2SC1623-T1B L5
Q951	35CB1113	TR 2SC2412K-T146 R
Q981	35CB2491	TR 2SC3906K-E2
Q982	350J5241	TR 2SC2389S-TP R
Q983	350A2001	TR 2SA1038S-TP R
Q984	35072752	TR 2SD1763A E
Q985	35030012	TR 2SB1186A E

SYMBOL	PART NO	DESCRIPTION
Q987	350J5262	TR 2SC4620 P-TV2

*** DIODES ***

D2001	361K7822	DIODE D1NL20,AT52
D2002	36CB0213	DIODE DAN212K-T146
D401	361K7778	DIODE PR1004G,AT52
D402	361K7778	DIODE PR1004G,AT52
D421	360K1025	DIODE 1SS133
D4H1	360K1025	DIODE 1SS133
D4H2	360K1025	DIODE 1SS133
D4P1	36CB0213	DIODE DAN212K-T146
D541	360K1025	DIODE 1SS133
D542	360K1025	DIODE 1SS133
D551	36107771	DIODE FE5DL-6596
D553	36107775	DIODE RX3Z(LF014-102)
D561	36107846	DIODE FMC-28UA
D562	36108250	DIODE FMQ-G5FS
D591	361K7778	DIODE PR1004G,AT52
D592	361K7778	DIODE PR1004G,AT52
D593	360K1025	DIODE 1SS133
D5A1	361K8252	DI RB721Q-40T72
D5A2	361K8252	DI RB721Q-40T72
D5E1	361K7777	DIODE 1SS244-T72
D5E2	361K7777	DIODE 1SS244-T72
D5E3	360K1025	DIODE 1SS133
D5G1	360K1025	DIODE 1SS133
D5G2	36107792	DIODE YG911S3R
D5G3	361K8252	DI RB721Q-40T72
D5G4	361K8252	DI RB721Q-40T72
D5R1	36107308	DIODE ERC20M-08
D5R2	361K7606	DIODE ERB44-08 V1
D5R3	361K7822	DIODE D1NL20,AT52
D5R4	361K7822	DIODE D1NL20,AT52
D5W1	36CB0072	DIODE HSM83-TL
D5X1	361K7822	DIODE D1NL20,AT52
D601	36108116	DIODE KBU605G-FA1
D602	361K7523	DIODE ERA15-04V1
D603	361K7174	DIODE RU1P V1
D604	361K7823	DI ERA18-02-V1
D622	361K7823	DI ERA18-02-V1
D623	361K7823	DI ERA18-02-V1
D624	361K7505	DIODE ERB44-06V1
D625	361K7823	DI ERA18-02-V1
D626	361K7823	DI ERA18-02-V1
D627	36107858	DI RG2A2(LF-B4)
D628	361K7842	DIODE ERB38-06(V1)
D629	361K7823	DI ERA18-02-V1
D651	361K7842	DIODE ERB38-06(V1)

SYMBOL	PART NO	DESCRIPTION
D653	361K7174	DIODE RU1P V1
D671	36107844	DIODE RU3A(LF-C4)
D672	361K7823	DI ERA18-02-V1
D673	361K7823	DI ERA18-02-V1
D6A1	36107835	DI RU3C(LF-C4)
D6E1	36107841	DIODE FMU-G16S
D6F1	36107729	DIODE YG901C2
D6G2	36107832	DI ERC30-01(L3)
D6H1	36107832	DI ERC30-01(L3)
D6K1	361K7823	DI ERA18-02-V1
D6L1	36107729	DIODE YG901C2
D6M1	36107729	DIODE YG901C2
D6P1	361K7523	DIODE ERA15-04V1
D6P2	361K7523	DIODE ERA15-04V1
D6V1	360K1025	DIODE 1SS133
D6V2	360K1025	DIODE 1SS133
D6V3	360K1025	DIODE 1SS133
D6V4	360K1025	DIODE 1SS133
D6Y1	36107320	DIODE FMG-G26S
D6Y2	36107701	DIODE RU4AM(LF-K2)
D6Y3	361K7842	DIODE ERB38-06(V1)
D711	360K1025	DIODE 1SS133
D712	360K1025	DIODE 1SS133
D713	360K1025	DIODE 1SS133
D721B	36CB0072	DIODE HSM83-TL
D721G	36CB0072	DIODE HSM83-TL
D721R	36CB0072	DIODE HSM83-TL
D722B	36CB0072	DIODE HSM83-TL
D722G	36CB0072	DIODE HSM83-TL
D722R	36CB0072	DIODE HSM83-TL
D741B	361K7777	DIODE 1SS244-T72
D741G	361K7777	DIODE 1SS244-T72
D741R	361K7777	DIODE 1SS244-T72
D771	360K1025	DIODE 1SS133
D781	360K1025	DIODE 1SS133
D782	360K1025	DIODE 1SS133
D783	36CB0072	DIODE HSM83-TL
D784	36CB0072	DIODE HSM83-TL
D7E1	360K1025	DIODE 1SS133
D7GA	360K1025	DIODE 1SS133
D7GF	360K1025	DIODE 1SS133
D7K1	361K7562	DIODE EGP10G G23
D8A1	36CB0233	DIODE RB411D-T146
D8M2B	360K1025	DIODE 1SS133
D8M2G	360K1025	DIODE 1SS133
D8M2R	360K1025	DIODE 1SS133
D8R2	36CB0054	DIODE DA204K-T
D8R3	36CB0054	DIODE DA204K-T

SYMBOL	PART NO	DESCRIPTION
D8U1	36CB0233	DIODE RB411D-T146
D951	360K1025	DIODE 1SS133
D981	36CB0213	DIODE DAN212K-T146
D982	36CB0213	DIODE DAN212K-T146
D984	36CB0213	DIODE DAN212K-T146
LED111	36801424	LED SMLS79723C
LED112	36801424	LED SMLS79723C
LED113	36801424	LED SMLS79723C
MD4P1	36CB0079	DIODE DAN202K-T146(0°)
MD4P2	36CB0054	DIODE DA204K-T
MD701B	36CB0054	DIODE DA204K-T
MD701G	36CB0054	DIODE DA204K-T
MD701R	36CB0054	DIODE DA204K-T
MD702B	36CB0054	DIODE DA204K-T
MD702G	36CB0054	DIODE DA204K-T
MD702R	36CB0054	DIODE DA204K-T
MD711	36CB0079	DIODE DAN202K-T146(0°)
MD7GE	36CB0079	DIODE DAN202K-T146(0°)
MD7GG	36CB0079	DIODE DAN202K-T146(0°)
ZD592	360A0055	DIODE MTZJ8.2B T-72
ZD5A1	360A0119	DIODE MTZJ33D-T72
ZD5E1	360A0039	DIODE MTZJ5.6B T-72
ZD5F1	360A0091	DIODE MTZJ20A
ZD5G1	360A0059	DIODE MTZJ9.1B T-72
ZD5GA	360A0035	DIODE MTZJ5.1B T-72
ZD5GC	360A0035	DIODE MTZJ5.1B T-72
ZD5X1	360A0043	DIODE MTZJ6.2B T-72
ZD621	360A0072	DIODE MTZJ12B
ZD622	360A0051	DIODE MTZJ7.5B T-72
ZD623	360K3116	DIODE RD4.7EB(3)-T4
ZD651	360A0075	DIODE MTZJ13A
ZD653	360K3120	DIODE RD24EB(3)-T4
ZD671	360A0021	DIODE MTZJ3.6B T-72
ZD672	360K3486	DI RD6.8JS AB(2)-T4
ZD6G1	360K3120	DIODE RD24EB(3)-T4
ZD6H1	360K3120	DIODE RD24EB(3)-T4
ZD6P1	360A0072	DIODE MTZJ12B
ZD6V1	360A0038	DIODE MTZJ5.6A T-72
ZD6V2	360A0064	DIODE MTZJ10C
ZD701	360A0039	DIODE MTZJ5.6B T-72
ZD702	360A0039	DIODE MTZJ5.6B T-72
ZD703	360A0039	DIODE MTZJ5.6B T-72
ZD704	360A0039	DIODE MTZJ5.6B T-72
ZD721	360A0060	DIODE MTZJ9.1C T-72
ZD852	360A0039	DIODE MTZJ5.6B T-72
ZD853	360A0039	DIODE MTZJ5.6B T-72
ZD854	360A0018	DIODE MTZJ3.3B T-72
ZD8A1	360A0039	DIODE MTZJ5.6B T-72

SYMBOL	PART NO	DESCRIPTION
ZD8A2	360A0039	DIODE MTZJ5.6B T-72
ZD951	360A0039	DIODE MTZJ5.6B T-72
ZD981	360A0026	DIODE MTZJ4.3A T-72

*** TRANSFORMERS ***

T551	45804033	TRANS,H.DRAIVE
T561	47710028	TRANS,H.OUTPUT
T5R1	47105736	FBT
T601	46311124	SWITCHING TRANS
T651	46305106	TRANS,SWITCHING (EER28)
T6Y1	46316102	SWITCHING TRANS
T981	45950005	D.F.TRANS(W515K)

*** VARIABLE RESISTORS ***

VR581	410G1157	R,VARIABLE B1.0K
VR5T1	415K5163	R,VARIABLE B200K

*** RELAYS & SWITCHES ***

RL6V1	65660047	RELAY RPEF-12
RL6V2	65660047	RELAY RPEF-12
SW101	65360051	TACT SWITCH SKHHQV
SW102	65360051	TACT SWITCH SKHHQV
SW103	65360051	TACT SWITCH SKHHQV
SW104	65360051	TACT SWITCH SKHHQV
SW105	65360051	TACT SWITCH SKHHQV
SW106	65360051	TACT SWITCH SKHHQV
SW107	65360051	TACT SWITCH SKHHQV
SW108	65360051	TACT SWITCH SKHHQV
SW581	65161075	SWITCH SLIDE SSSF022-S09N
SW601	65360071	PUSH SWITCH ESB92S21B

*** PWB ASSYS ***

	843E6A02	SW/HV PWB ASSY
	843E6B01	SUB PWB ASSY
	843E6D02	DEF PWB ASSY
	843E6P01	CONV PWB ASSY
	843E7C01	VIDEO PWB ASSY

*** COILS & FILTERS ***

DEG	61322101	DEGAUSSIING COIL(85T,10H)
EMC	61322303	CORNER COIL(190T,50H)
EMF	61322304	COIL(50T,40H)
FL561	616J9019	FERAITE BEADS HF55BTL
FL6T1	61062235	COIL,FILTER (LFZ2805V10)
FL6T2	61062234	COIL,FILTER (LFZ2404V11)
L561	610G0342	CHOKECOIL TSL1112RA-331KR
L562	46204008	COIL,CHOKE 4MH
L5G1	610F3025	COIL,FILTER 47UH

SYMBOL	PART NO	DESCRIPTION
L5G2	46205005	COIL,CHOKE 4MH (EI25)
L5R1	610G0233	FILTER CHOKE PJ8T-470K
L5R2	610F3014	COIL,FILTER 3.3UH
L601	616K5076	COIL,BEADS
L602	616K5076	COIL,BEADS
L621	610E4001	COIL,FILTER 10UH
L622	610E4001	COIL,FILTER 10UH
L6A1	610G0335	CHOKECOIL TSL1112RA-680K1
L6E1	610F3023	COIL,FILTER 33UH
L6E2	610G0322	CHOKECOIL TSL0709-101KR66
L6F1	610G0333	CHOKECOIL TSL1112RA-330K2
L6F2	610G0333	CHOKECOIL TSL1112RA-330K2
L6H1	610F3023	COIL,FILTER 33UH
L6H2	610G0335	CHOKECOIL TSL1112RA-680K1
L6K1	610F3023	COIL,FILTER 33UH
L6L1	610G0333	CHOKECOIL TSL1112RA-330K2
L6M1	610G0333	CHOKECOIL TSL1112RA-330K2
L6Y1	61099166	COIL,CHOKE 400UH
L711	610E1729	COIL,FILTER 100UH
L731	610G0111	INDUCTOR,BEADS(FBR07HA121
L732	610G0111	INDUCTOR,BEADS(FBR07HA121
L763	610F3025	COIL,FILTER 47UH
L791	610E1725	COIL,FILTER 47UH
L901B	610F6505	COIL,FILTER 0.22UH
L901G	610F6505	COIL,FILTER 0.22UH
L901R	610F6505	COIL,FILTER 0.22UH
LC151	616K6971	NOISE FILTER TY2E103MCT
LC4H1	616K6971	NOISE FILTER TY2E103MCT
LC763	616K6942	NOISE FILTER FILMAC TU20M
LC764	616K6942	NOISE FILTER FILMAC TU20M
LC765	616K6942	NOISE FILTER FILMAC TU20M
LC766	616K6942	NOISE FILTER FILMAC TU20M
LC767	390J9028	FILTER ZJSC-R47-391TA
LC768	390J9028	FILTER ZJSC-R47-391TA
LC769	616K6970	NOISE FILTER TY2E101MCT
LC76A	616K6970	NOISE FILTER TY2E101MCT
LC76E	616K6971	NOISE FILTER TY2E103MCT
LC76F	616K6971	NOISE FILTER TY2E103MCT
LC76G	616K6971	NOISE FILTER TY2E103MCT
LC76H	616K6971	NOISE FILTER TY2E103MCT
LC76K	616K6971	NOISE FILTER TY2E103MCT
LC76M	616K6971	NOISE FILTER TY2E103MCT
LC76N	616K6971	NOISE FILTER TY2E103MCT
LC76R	390J9028	FILTER ZJSC-R47-391TA
LC851	616K6970	NOISE FILTER TY2E101MCT
LC852	616K6970	NOISE FILTER TY2E101MCT
LC853	616K6970	NOISE FILTER TY2E101MCT
LC854	616K6971	NOISE FILTER TY2E103MCT

SYMBOL	PART NO	DESCRIPTION
LC901	616K6971	NOISE FILTER TY2E103MCT
LC902	616K6971	NOISE FILTER TY2E103MCT
LC903	616K6970	NOISE FILTER TY2E101MCT
MR8U1	39032303	R,NETWORK 8L 10K 1/50W
MR8U2	39032303	R,NETWORK 8L 10K 1/50W
MRC801	39040002	RC,NETWORK 10K 1K 0.01UF
MRC802	39040002	RC,NETWORK 10K 1K 0.01UF
R5R3	616J9019	FERAITE BEADS HF55BTL
T571	60918114	COIL,VARIABLE LIN.

*** ELECTRICAL PARTS & MISCELLANEOUS PARTS ***

CABLE	73893283	SIGNAL CABLE MD15P J-H
CNBNC	32990281	PANEL,MD-SUB/BNC
CNCRT	70032275	CRT SOCKET HPS0720-015005
CORD	70800087	POWER CORD E-2 L1.8 GRY
F671	666J9242	FUSE 25101.6,AT52
F6H1	666J9141	FUSE 25102.5,AT52
F6T1	66671040	FUSE 250V 5A(215)
HD562	31709503	SHEET,INSULATOR
IC2001	79645922	HV PROTECTOR UNIT
IC4H1	79610572	UNIT,SENSOR TMC3000NF(7)
IN6T1	70521069	INLET SK-1019(DELTA)
PC621	38200354	PHOTOCOUPLER PC123FY2
PC651	38200354	PHOTOCOUPLER PC123FY2
PC6P1	38200354	PHOTOCOUPLER PC123FY2
SG901B	329J0047	ARRESTER (300V),AT52
SG901G	329J0047	ARRESTER (300V),AT52
SG901R	329J0047	ARRESTER (300V),AT52
SG902	329J0047	ARRESTER (300V),AT52
SG903	667K6007	SPARK GAP 1.5KV
SG951	667K6007	SPARK GAP 1.5KV
TH6V1	38112071	POSISTOR (PTH451A180M270A
TH6V2	38112072	POSISTOR (PTH451ABG3R0Q14
USBCAB	73893284	USB CABLE (COA1) J-PC99
X801	64098039	X'TAL(10.000MHZ)
X851	64098070	X'TAL HC-49U/S(6MHZ)CIT
X8M1	64098075	X'TAL 20MHZ(CSA-309)
X8U1	64098072	X'TAL 25MHZ(CSA-309)

*** KNOBS & PUSH BUTTONS ***

A4501	2E457751	PUSH BUTTON(CONTROL)

*** APPEARANCE PARTS ***

A3001	2E323932	CABINET FRONT ASSY
A3002	2E322123	CABINET BACK
A4001	25430552	CONTROL PANEL
A4003	2E430783	REVOLVING STAND ASSY
A5004	2E548061	CHASSIS BASE

SYMBOL	PART NO	DESCRIPTION

*** PRINTED & PACKING MATERIALS ***

A7001	2E790471	NAME PLATE,INSTRUCTION
A7002	2E790821	LABEL(ESCUTCHEON)
A7503	2E785131	LABEL(PTB)
A8001	2E837651	CARTON BOX(CN921B/R)
A8003	2E835891	FILLER(T).CARTON
A8004	2E835901	FILLER(B).CARTON
A8005	2E836001	PLATE,PULL
A8007	2E833831	SHEET PROTECTION
CDROM	68830763	FP950/1350 CD-ROM VER1.1
MANUAL	78134182	MANUAL CN756/CN921 B USA

*** RESISTORS ***

J413	40AA1000	R,CHIP 0H 5% 1/8W
J414	40AA1000	R,CHIP 0H 5% 1/8W
J415	40AA1000	R,CHIP 0H 5% 1/8W
J416	40AA1000	R,CHIP 0H 5% 1/8W
J419	40AA1000	R,CHIP 0H 5% 1/8W
J420	40AA1000	R,CHIP 0H 5% 1/8W
J421	40AA1000	R,CHIP 0H 5% 1/8W
J422	40AA1000	R,CHIP 0H 5% 1/8W
J423	40AA1000	R,CHIP 0H 5% 1/8W
J424	40AA1000	R,CHIP 0H 5% 1/8W
J5W1	40AAD100	R,CHIP 0.0H 5% 1/2W
J5W2	40AA1000	R,CHIP 0H 5% 1/8W
J5W3	40AA1000	R,CHIP 0H 5% 1/8W
J5W4	40AA1000	R,CHIP 0H 5% 1/8W
J5W5	40AA1000	R,CHIP 0H 5% 1/8W
J5W7	40AAD100	R,CHIP 0.0H 5% 1/2W
J5W8	40AA1000	R,CHIP 0H 5% 1/8W
J5W9	40AA1000	R,CHIP 0H 5% 1/8W
J5Y1	40AA1000	R,CHIP 0H 5% 1/8W
J5Y2	40AA1000	R,CHIP 0H 5% 1/8W
J5Y3	40AA1000	R,CHIP 0H 5% 1/8W
J5Y4	40AA1000	R,CHIP 0H 5% 1/8W
J5Y5	40AA1000	R,CHIP 0H 5% 1/8W
J733	40AA3000	R,CHIP 0.0H 5% 1/10W
J8N1	40AA3000	R,CHIP 0.0H 5% 1/10W
J8N2	40AA3000	R,CHIP 0.0H 5% 1/10W
J8N3	40AA3000	R,CHIP 0.0H 5% 1/10W
J8N4	40AA3000	R,CHIP 0.0H 5% 1/10W
J952	40AA1000	R,CHIP 0H 5% 1/8W
LC761B	401J9820	R,CARBON 0.0H
LC761G	401J9820	R,CARBON 0.0H
LC761R	401J9820	R,CARBON 0.0H
LC762B	401J9820	R,CARBON 0.0H
LC762G	401J9820	R,CARBON 0.0H

SYMBOL	PART NO	DESCRIPTION
LC762R	401J9820	R,CARBON 0.0H
R101	40AAD129	R,CHIP 15H 5% 1/2W
R102	40AB3161	R,CHIP 330H 1% 1/10W
R103	40AB3173	R,CHIP 1.0K 1% 1/10W
R104	40AB3169	R,CHIP 680H 1% 1/10W
R105	40AB3170	R,CHIP 750H 1% 1/10W
R106	40AB3155	R,CHIP 180H 1% 1/10W
R111	40AA3125	R,CHIP 10H 5% 1/10W
R112	40AA3125	R,CHIP 10H 5% 1/10W
R113	40AA3125	R,CHIP 10H 5% 1/10W
R151	40AA3146	R,CHIP 75H 5% 1/10W
R2001	404K5109	R,METAL 2.2H 5% 1/4W
R2002	40AB3224	R,CHIP 130K 1% 1/10W
R401	40AA3181	R,CHIP 2.2K 5% 1/10W
R402	40AC7301	R,CHIP 1.0H 5% 1/2W
R403	40AB3199	R,CHIP 12K 1% 1/10W
R404	40AB3183	R,CHIP 2.7K 1% 1/10W
R405	40AAD189	R,CHIP 4.7K 5% 1/2W
R406	40499440	R,METAL 1.0H 1% 1W
R411	40AB3211	R,CHIP 39K 1% 1/10W
R412	40AA3159	R,CHIP 270H 5% 1/10W
R413	40AB3208	R,CHIP 30K 1% 1/10W
R414	40AA2165	R,CHIP 470H 5% 1/4W
R421	40AA3197	R,CHIP 10K 5% 1/10W
R422	40AA3197	R,CHIP 10K 5% 1/10W
R423	40AA3197	R,CHIP 10K 5% 1/10W
R424	40AA3197	R,CHIP 10K 5% 1/10W
R425	40AB3197	R,CHIP 10K 1% 1/10W
R426	40AB3197	R,CHIP 10K 1% 1/10W
R427	40AB3197	R,CHIP 10K 1% 1/10W
R428	40AB3197	R,CHIP 10K 1% 1/10W
R429	40AA3215	R,CHIP 56K 5% 1/10W
R42A	40AA3149	R,CHIP 100H 5% 1/10W
R42D	40AA3149	R,CHIP 100H 5% 1/10W
R42E	40AA3149	R,CHIP 100H 5% 1/10W
R4H1	401K5721	R,CARBON 100K 5% 1/6W
R4H2	401K5697	R,CARBON 10K 5% 1/6W
R4H5	401K5721	R,CARBON 100K 5% 1/6W
R4H6	401K5697	R,CARBON 10K 5% 1/6W
R4H7	404C1680	R,METAL 2.0K 1% 1/6W
R4H8	404C1673	R,METAL 1.0K 1% 1/6W
R4H9	404K5125	R,METAL 10H 5% 1/4W
R4J1	40AA3199	R,CHIP 12K 5% 1/10W
R4J2	40AA3149	R,CHIP 100H 5% 1/10W
R4J6	40372137	R,METAL 33H 5% 2W
R4J7	40AA3207	R,CHIP 27K 5% 1/10W
R4K1	40AA3199	R,CHIP 12K 5% 1/10W
R4K2	40AA3149	R,CHIP 100H 5% 1/10W

SYMBOL	PART NO	DESCRIPTION
R4K6	40371145	R,METAL 68H 5% 1W
R4K7	40AA3207	R,CHIP 27K 5% 1/10W
R4K8	40AA3217	R,CHIP 68K 5% 1/10W
R4K9	40AA3210	R,CHIP 36K 5% 1/10W
R4KE	40AA2155	R,CHIP 180H 5% 1/4W
R4L1	40AA3199	R,CHIP 12K 5% 1/10W
R4L2	40AA3149	R,CHIP 100H 5% 1/10W
R4L6	40372139	R,METAL 39H 5% 2W
R4L7	40AA3207	R,CHIP 27K 5% 1/10W
R4M1	40AA3199	R,CHIP 12K 5% 1/10W
R4M2	40AA3149	R,CHIP 100H 5% 1/10W
R4M6	40372139	R,METAL 39H 5% 2W
R4M7	40AA3207	R,CHIP 27K 5% 1/10W
R4N1	40AA3199	R,CHIP 12K 5% 1/10W
R4N2	40AA3149	R,CHIP 100H 5% 1/10W
R4N6	40372139	R,METAL 39H 5% 2W
R4N7	40AA3207	R,CHIP 27K 5% 1/10W
R4P1	40AB3219	R,CHIP 82K 1% 1/10W
R4P4	404C1740	R,METAL 620K 1% 1/6W
R4P5	40AA3149	R,CHIP 100H 5% 1/10W
R4P6	40AA3000	R,CHIP 0.0H 5% 1/10W
R4P7	40AA3197	R,CHIP 10K 5% 1/10W
R4P8	404J9476	R,METAL 2.2M 1% 1/4W
R4P9	404C1745	R,METAL 1.0M 1% 1/6W
R4PA	40AB3225	R,CHIP 150K 1% 1/10W
R4PE	40AB3203	R,CHIP 18K 1% 1/10W
R4PF	40AB3212	R,CHIP 43K 1% 1/10W
R4PH	40AB3219	R,CHIP 82K 1% 1/10W
R4R1	40AA3199	R,CHIP 12K 5% 1/10W
R4R2	40AA3149	R,CHIP 100H 5% 1/10W
R4R6	40372139	R,METAL 39H 5% 2W
R4R7	40AA3207	R,CHIP 27K 5% 1/10W
R501	40AA3173	R,CHIP 1.0K 5% 1/10W
R502	40AA1155	R,CHIP 180H 5% 1/8W
R503	40AB3177	R,CHIP 1.5K 1% 1/10W
R504	40AB3168	R,CHIP 620H 1% 1/10W
R506	40AA3169	R,CHIP 680H 5% 1/10W
R507	40AA3169	R,CHIP 680H 5% 1/10W
R508	40AB3176	R,CHIP 1.3K 1% 1/10W
R509	40AA3199	R,CHIP 12K 5% 1/10W
R50A	40AB3183	R,CHIP 2.7K 1% 1/10W
R50C	40AB3182	R,CHIP 2.4K 1% 1/10W
R50E	40AB3210	R,CHIP 36K 1% 1/10W
R50G	40AB3197	R,CHIP 10K 1% 1/10W
R50H	40AB3199	R,CHIP 12K 1% 1/10W
R50J	40AA3221	R,CHIP 100K 5% 1/10W
R50K	40AB3187	R,CHIP 3.9K 1% 1/10W
R50L	40AB3215	R,CHIP 56K 1% 1/10W

SYMBOL	PART NO	DESCRIPTION
R50M	40AB3215	R,CHIP 56K 1% 1/10W
R50P	40AA3197	R,CHIP 10K 5% 1/10W
R510	40AA1151	R,CHIP 120H 5% 1/8W
R511	40AA3245	R,CHIP 1.0M 5% 1/10W
R512	40AA3173	R,CHIP 1.0K 5% 1/10W
R513	40AA3189	R,CHIP 4.7K 5% 1/10W
R514	40AA3221	R,CHIP 100K 5% 1/10W
R515	40AA2165	R,CHIP 470H 5% 1/4W
R516	40AA3173	R,CHIP 1.0K 5% 1/10W
R517	40AA3173	R,CHIP 1.0K 5% 1/10W
R518	40AA3190	R,CHIP 5.1K 5% 1/10W
R519	40AA3193	R,CHIP 6.8K 5% 1/10W
R51A	40AA3149	R,CHIP 100H 5% 1/10W
R51F	40AA3190	R,CHIP 5.1K 5% 1/10W
R51G	40AA3169	R,CHIP 680H 5% 1/10W
R51P	404K5125	R,METAL 10H 5% 1/4W
R51R	404K5133	R,METAL 22H 5% 1/4W
R51W	40AA3189	R,CHIP 4.7K 5% 1/10W
R520	40AA3190	R,CHIP 5.1K 5% 1/10W
R521	40AA3197	R,CHIP 10K 5% 1/10W
R522	40AA3149	R,CHIP 100H 5% 1/10W
R523	40AA3149	R,CHIP 100H 5% 1/10W
R524	40AA3149	R,CHIP 100H 5% 1/10W
R525	40AA3197	R,CHIP 10K 5% 1/10W
R526	40AA3173	R,CHIP 1.0K 5% 1/10W
R527	40AA3173	R,CHIP 1.0K 5% 1/10W
R528	40AA3197	R,CHIP 10K 5% 1/10W
R529	40AA3208	R,CHIP 30K 5% 1/10W
R52A	40AA3165	R,CHIP 470H 5% 1/10W
R52C	40AA3161	R,CHIP 330H 5% 1/10W
R52E	40AA3173	R,CHIP 1.0K 5% 1/10W
R52F	40AA3173	R,CHIP 1.0K 5% 1/10W
R52H	40AA3173	R,CHIP 1.0K 5% 1/10W
R531	40AA3173	R,CHIP 1.0K 5% 1/10W
R532	40AA1149	R,CHIP 100H 5% 1/8W
R533	40AA3149	R,CHIP 100H 5% 1/10W
R53E	40AA3149	R,CHIP 100H 5% 1/10W
R53F	40AA3149	R,CHIP 100H 5% 1/10W
R540	40AA3209	R,CHIP 33K 5% 1/10W
R541	40AA3197	R,CHIP 10K 5% 1/10W
R542	40AA3173	R,CHIP 1.0K 5% 1/10W
R543	40AA3173	R,CHIP 1.0K 5% 1/10W
R544	40AA3173	R,CHIP 1.0K 5% 1/10W
R545	40AB3197	R,CHIP 10K 1% 1/10W
R546	40AB3197	R,CHIP 10K 1% 1/10W
R548	40AA3197	R,CHIP 10K 5% 1/10W
R549	40AA3208	R,CHIP 30K 5% 1/10W
R54A	40AA3173	R,CHIP 1.0K 5% 1/10W

SYMBOL	PART NO	DESCRIPTION
R556	40AA3149	R,CHIP 100H 5% 1/10W
R557	404J9510	R,METAL 2.2H 5% 1/4W
R558	40AA3125	R,CHIP 10H 5% 1/10W
R559	40371133	R,METAL 22H 5% 1W
R55A	40399098	R,METAL 1.0H 5% 5W
R55E	40AA3197	R,CHIP 10K 5% 1/10W
R55K	401J9820	R,CARBON 0.0H
R561	40371125	R,METAL 10H 5% 1W
R562	40373127	R,METAL 12H 5% 3W
R56A	40AB3211	R,CHIP 39K 1% 1/10W
R56C	40AB3199	R,CHIP 12K 1% 1/10W
R56E	40AA3197	R,CHIP 10K 5% 1/10W
R56F	40AA3205	R,CHIP 22K 5% 1/10W
R571	40383028	R,METAL 180H 5% 3W
R573	40AA1239	R,CHIP 560K 5% 1/8W
R574	40AA1239	R,CHIP 560K 5% 1/8W
R575	40AA1239	R,CHIP 560K 5% 1/8W
R576	40AA1239	R,CHIP 560K 5% 1/8W
R577	40AA1239	R,CHIP 560K 5% 1/8W
R578	40AA1239	R,CHIP 560K 5% 1/8W
R579	40AA3149	R,CHIP 100H 5% 1/10W
R57A	40AA3149	R,CHIP 100H 5% 1/10W
R57C	40AA3149	R,CHIP 100H 5% 1/10W
R57E	40AA3149	R,CHIP 100H 5% 1/10W
R57F	40AA3149	R,CHIP 100H 5% 1/10W
R57J	40AA3149	R,CHIP 100H 5% 1/10W
R57K	40373141	R,METAL 47H 5% 3W
R57L	40AA3189	R,CHIP 4.7K 5% 1/10W
R57M	40AA3173	R,CHIP 1.0K 5% 1/10W
R57N	40AA3197	R,CHIP 10K 5% 1/10W
R57P	40AA3213	R,CHIP 47K 5% 1/10W
R57T	40AA5145	R,CHIP 68H 5% 1/4W
R57X	40AA3149	R,CHIP 100H 5% 1/10W
R57Y	40AA1239	R,CHIP 560K 5% 1/8W
R581	40AA1165	R,CHIP 470H 5% 1/8W
R582	40AA3125	R,CHIP 10H 5% 1/10W
R583	40371129	R,METAL 15H 5% 1W
R584	40371131	R,METAL 18H 5% 1W
R592	40AB3223	R,CHIP 120K 1% 1/10W
R593	40AB3197	R,CHIP 10K 1% 1/10W
R595	40AA1205	R,CHIP 22K 5% 1/8W
R596	40AA1213	R,CHIP 47K 5% 1/8W
R597	40AA1197	R,CHIP 10K 5% 1/8W
R598	40AA3209	R,CHIP 33K 5% 1/10W
R599	40AB3233	R,CHIP 330K 1% 1/10W
R59A	40AB3224	R,CHIP 130K 1% 1/10W
R59C	40AB3206	R,CHIP 24K 1% 1/10W
R59E	40AB3205	R,CHIP 22K 1% 1/10W

SYMBOL	PART NO	DESCRIPTION
R59F	40AA3199	R,CHIP 12K 5% 1/10W
R59G	40AB3185	R,CHIP 3.3K 1% 1/10W
R59J	40AA3218	R,CHIP 75K 5% 1/10W
R59K	40AA3191	R,CHIP 5.6K 5% 1/10W
R59L	40AA3197	R,CHIP 10K 5% 1/10W
R59M	40AB3200	R,CHIP 13K 1% 1/10W
R59N	404K5133	R,METAL 22H 5% 1/4W
R59P	40AB3201	R,CHIP 15K 1% 1/10W
R59R	40AB5223	R,CHIP 120K 1% 1/2W
R59T	40AB3175	R,CHIP 1.2K 1% 1/10W
R59W	40AA3197	R,CHIP 10K 5% 1/10W
R5A1	404K5125	R,METAL 10H 5% 1/4W
R5A3	40AA3201	R,CHIP 15K 5% 1/10W
R5A4	40AB3229	R,CHIP 220K 1% 1/10W
R5A5	40AA3197	R,CHIP 10K 5% 1/10W
R5A6	40AA3197	R,CHIP 10K 5% 1/10W
R5A7	40AA3191	R,CHIP 5.6K 5% 1/10W
R5A8	40AA3239	R,CHIP 560K 5% 1/10W
R5A9	404J9509	R,METAL 470H 1% 1/4W
R5AC	40AA3191	R,CHIP 5.6K 5% 1/10W
R5AE	40371221	R,METAL 100K 5% 1W
R5E1	404J9510	R,METAL 2.2H 5% 1/4W
R5E2	40AA3179	R,CHIP 1.8K 5% 1/10W
R5E3	40371187	R,METAL 3.9K 5% 1W
R5E4	40AA3000	R,CHIP 0.0H 5% 1/10W
R5E5	40AA3155	R,CHIP 180H 5% 1/10W
R5F1	40371339	R,METAL 0.56H 5% 1W
R5F2	401G6191	R,CARBON 5.6K 5% 1/4W
R5F3	40AA3235	R,CHIP 390K 5% 1/10W
R5F4	40AA3221	R,CHIP 100K 5% 1/10W
R5F5	40AA3197	R,CHIP 10K 5% 1/10W
R5F6	40AA1207	R,CHIP 27K 5% 1/8W
R5F7	40AA3205	R,CHIP 22K 5% 1/10W
R5F8	40AB3197	R,CHIP 10K 1% 1/10W
R5G1	40AA5141	R,CHIP 47H 5% 1/4W
R5G2	40AA3195	R,CHIP 8.2K 5% 1/10W
R5G3	40AC5309	R,CHIP 2.2H 5% 1/8W
R5GA	40AAD163	R,CHIP 390H 5% 1/2W
R5GC	40AAD163	R,CHIP 390H 5% 1/2W
R5GE	40AB3201	R,CHIP 15K 1% 1/10W
R5GF	40AB3197	R,CHIP 10K 1% 1/10W
R5P1	40AA2139	R,CHIP 39H 5% 1/4W
R5P2	40AA2141	R,CHIP 47H 5% 1/4W
R5R1	40224137	R,WIRE 33H 5% 5W
R5R2	40224137	R,WIRE 33H 5% 5W
R5T1	401K5717	R,CARBON 68K 5% 1/6W
R5T2	404C1718	R,METAL 75K 1% 1/6W
R5U1	40AB3183	R,CHIP 2.7K 1% 1/10W

SYMBOL	PART NO	DESCRIPTION
R5U2	40AB3219	R,CHIP 82K 1% 1/10W
R5U3	40AB1231	R,CHIP 270K 1% 1/8W
R5W1	40AA3211	R,CHIP 39K 5% 1/10W
R5W2	40AA3201	R,CHIP 15K 5% 1/10W
R5W3	40AA3197	R,CHIP 10K 5% 1/10W
R5W6	40AA3214	R,CHIP 51K 5% 1/10W
R5W7	40AA3213	R,CHIP 47K 5% 1/10W
R5W8	40AB3180	R,CHIP 2.0K 1% 1/10W
R5W9	40AA3197	R,CHIP 10K 5% 1/10W
R5X1	404K5125	R,METAL 10H 5% 1/4W
R5X2	40AA2199	R,CHIP 12K 5% 1/4W
R5X3	40AA3221	R,CHIP 100K 5% 1/10W
R5X4	40AB3226	R,CHIP 160K 1% 1/10W
R5X5	40AB3201	R,CHIP 15K 1% 1/10W
R5Y1	40AA3197	R,CHIP 10K 5% 1/10W
R602	40299104	R,WIRE 10H 5% 5W
R603	40AA3197	R,CHIP 10K 5% 1/10W
R604	40372143	R,METAL 56H 5% 2W
R605	40299181	R,WIRE 56K 5% 5W
R606	40299104	R,WIRE 10H 5% 5W
R621	40AA3169	R,CHIP 680H 5% 1/10W
R622	40371103	R,METAL 1.2H 5% 1W
R623	40371337	R,METAL 0.47H 5% 1W
R624	40AB3149	R,CHIP 100H 1% 1/10W
R625	40499462	R,METAL 0.12H 5% 3W
R626	404C1689	R,METAL 4.7K 1% 1/6W
R627	404C1745	R,METAL 1.0M 1% 1/6W
R628	404C1745	R,METAL 1.0M 1% 1/6W
R629	40AB3217	R,CHIP 68K 1% 1/10W
R630	40AB3217	R,CHIP 68K 1% 1/10W
R631	401K5739	R,CARBON 560K 5% 1/6W
R632	401K5739	R,CARBON 560K 5% 1/6W
R633	40AA3205	R,CHIP 22K 5% 1/10W
R634	40372217	R,METAL 68K 5% 2W
R635	40372221	R,METAL 100K 5% 2W
R636	401G6109	R,CARBON 2.2H 5% 1/4W
R638	40372197	R,METAL 10K 5% 2W
R639	40AA3179	R,CHIP 1.8K 5% 1/10W
R640	40AA3169	R,CHIP 680H 5% 1/10W
R641	40AA3171	R,CHIP 820H 5% 1/10W
R642	40AA3221	R,CHIP 100K 5% 1/10W
R651	401K5643	R,CARBON 56H 5% 1/6W
R652	40AA3181	R,CHIP 2.2K 5% 1/10W
R653	40AA3181	R,CHIP 2.2K 5% 1/10W
R655	40371209	R,METAL 33K 5% 1W
R656	40AB3185	R,CHIP 3.3K 1% 1/10W
R657	40AA3149	R,CHIP 100H 5% 1/10W
R658	401K5697	R,CARBON 10K 5% 1/6W

SYMBOL	PART NO	DESCRIPTION
R659	40372139	R,METAL 39H 5% 2W
R660	40372207	R,METAL 27K 5% 2W
R662	401C6665	R,CARBON 470H 5% 1/4W
R663	40AB3213	R,CHIP 47K 1% 1/10W
R664	40AB3193	R,CHIP 6.8K 1% 1/10W
R665	40AA3201	R,CHIP 15K 5% 1/10W
R666	401C6665	R,CARBON 470H 5% 1/4W
R671	40373109	R,METAL 2.2H 5% 3W
R672	40AA3189	R,CHIP 4.7K 5% 1/10W
R673	40AA3169	R,CHIP 680H 5% 1/10W
R674	40373187	R,METAL 3.9K 5% 3W
R675	40AA3177	R,CHIP 1.5K 5% 1/10W
R676	401K5671	R,CARBON 820H 5% 1/6W
R677	40371199	R,METAL 12K 5% 1W
R678	40AA3219	R,CHIP 82K 5% 1/10W
R694	404C1745	R,METAL 1.0M 1% 1/6W
R695	404C1745	R,METAL 1.0M 1% 1/6W
R696	40AA3187	R,CHIP 3.9K 5% 1/10W
R697	40AA3219	R,CHIP 82K 5% 1/10W
R6A1	40371221	R,METAL 100K 5% 1W
R6E1	40372199	R,METAL 12K 5% 2W
R6F1	40499508	R,METAL 0.1H 5% 1/2W
R6G1	40499507	R,METAL 0.22H 5% 1/2W
R6K1	404E1329	R,METAL 0.22H 5% 1/4W
R6K2	401K5669	R,CARBON 680H 5% 1/6W
R6L1	40372167	R,METAL 560H 5% 2W
R6L2	401G6125	R,CARBON 10H 5% 1/4W
R6M2	401G6125	R,CARBON 10H 5% 1/4W
R6P1	40372217	R,METAL 68K 5% 2W
R6P2	401K5701	R,CARBON 15K 5% 1/6W
R6T1	401H6757	R,CARBON 3.3M 5% 1/2W
R6V1	401C6631	R,CARBON 18H 5% 1/4W
R6V2	401G6109	R,CARBON 2.2H 5% 1/4W
R6V3	401K5697	R,CARBON 10K 5% 1/6W
R6V4	401K5669	R,CARBON 680H 5% 1/6W
R6V5	401K5691	R,CARBON 5.6K 5% 1/6W
R6V6	401K5721	R,CARBON 100K 5% 1/6W
R6V7	401K5745	R,CARBON 1.0M 5% 1/6W
R6V8	401K5721	R,CARBON 100K 5% 1/6W
R6V9	401K5689	R,CARBON 4.7K 5% 1/6W
R6W0	401K5673	R,CARBON 1.0K 5% 1/6W
R6W1	401K5689	R,CARBON 4.7K 5% 1/6W
R6W2	404C1715	R,METAL 56K 1% 1/6W
R6W3	401K5663	R,CARBON 390H 5% 1/6W
R701B	40AB3153	R,CHIP 150H 1% 1/10W
R701G	40AB3153	R,CHIP 150H 1% 1/10W
R701R	40AB3153	R,CHIP 150H 1% 1/10W
R702B	40AB3153	R,CHIP 150H 1% 1/10W

SYMBOL	PART NO	DESCRIPTION
R702G	40AB3153	R,CHIP 150H 1% 1/10W
R702R	40AB3153	R,CHIP 150H 1% 1/10W
R703B	40AB3153	R,CHIP 150H 1% 1/10W
R703G	40AB3153	R,CHIP 150H 1% 1/10W
R703R	40AB3153	R,CHIP 150H 1% 1/10W
R704B	40AB3153	R,CHIP 150H 1% 1/10W
R704G	40AB3153	R,CHIP 150H 1% 1/10W
R704R	40AB3153	R,CHIP 150H 1% 1/10W
R709	40AA3175	R,CHIP 1.2K 5% 1/10W
R70A	40AA3143	R,CHIP 56H 5% 1/10W
R70E	40AA3175	R,CHIP 1.2K 5% 1/10W
R70F	40AA3143	R,CHIP 56H 5% 1/10W
R712	40AA3149	R,CHIP 100H 5% 1/10W
R713	40AB3199	R,CHIP 12K 1% 1/10W
R714	40AB3177	R,CHIP 1.5K 1% 1/10W
R716B	40AAD165	R,CHIP 470H 5% 1/2W
R716G	40AAD165	R,CHIP 470H 5% 1/2W
R716R	40AAD165	R,CHIP 470H 5% 1/2W
R717B	40AA3151	R,CHIP 120H 5% 1/10W
R717G	40AA3151	R,CHIP 120H 5% 1/10W
R717R	40AA3151	R,CHIP 120H 5% 1/10W
R718B	40AAD159	R,CHIP 270H 5% 1/2W
R718G	40AAD159	R,CHIP 270H 5% 1/2W
R718R	40AAD159	R,CHIP 270H 5% 1/2W
R719B	40AA3151	R,CHIP 120H 5% 1/10W
R719G	40AA3151	R,CHIP 120H 5% 1/10W
R719R	40AA3151	R,CHIP 120H 5% 1/10W
R71A	40AA3177	R,CHIP 1.5K 5% 1/10W
R71E	40AA3173	R,CHIP 1.0K 5% 1/10W
R71F	40AA3149	R,CHIP 100H 5% 1/10W
R71G	40AA3149	R,CHIP 100H 5% 1/10W
R71H	40AA3155	R,CHIP 180H 5% 1/10W
R71K	40AA3000	R,CHIP 0.0H 5% 1/10W
R721B	40AA3149	R,CHIP 100H 5% 1/10W
R721G	40AA3149	R,CHIP 100H 5% 1/10W
R721R	40AA3149	R,CHIP 100H 5% 1/10W
R722B	40AB3185	R,CHIP 3.3K 1% 1/10W
R722G	40AB3185	R,CHIP 3.3K 1% 1/10W
R722R	40AB3185	R,CHIP 3.3K 1% 1/10W
R723B	40AB3171	R,CHIP 820H 1% 1/10W
R723G	40AB3171	R,CHIP 820H 1% 1/10W
R723R	40AB3171	R,CHIP 820H 1% 1/10W
R724B	40AB3151	R,CHIP 120H 1% 1/10W
R724G	40AB3151	R,CHIP 120H 1% 1/10W
R724R	40AB3151	R,CHIP 120H 1% 1/10W
R726B	40AA3149	R,CHIP 100H 5% 1/10W
R726G	40AA3149	R,CHIP 100H 5% 1/10W
R726R	40AA3149	R,CHIP 100H 5% 1/10W

SYMBOL	PART NO	DESCRIPTION
R728	40AAD163	R,CHIP 390H 5% 1/2W
R72F	40AA3173	R,CHIP 1.0K 5% 1/10W
R731	40AA3149	R,CHIP 100H 5% 1/10W
R732	40AA3149	R,CHIP 100H 5% 1/10W
R733	40AA3149	R,CHIP 100H 5% 1/10W
R734	40AA3149	R,CHIP 100H 5% 1/10W
R736B	40AA3143	R,CHIP 56H 5% 1/10W
R736G	40AA3141	R,CHIP 47H 5% 1/10W
R736R	40AA3143	R,CHIP 56H 5% 1/10W
R738	40AA3169	R,CHIP 680H 5% 1/10W
R739	40AA3181	R,CHIP 2.2K 5% 1/10W
R73A	40AA3173	R,CHIP 1.0K 5% 1/10W
R73E	40AB3191	R,CHIP 5.6K 1% 1/10W
R73F	40AB3183	R,CHIP 2.7K 1% 1/10W
R73G	40AB3205	R,CHIP 22K 1% 1/10W
R73H	40AA3173	R,CHIP 1.0K 5% 1/10W
R73J	40AB3191	R,CHIP 5.6K 1% 1/10W
R73K	40AB3183	R,CHIP 2.7K 1% 1/10W
R73WB	40AA3137	R,CHIP 33H 5% 1/10W
R73WG	40AA3137	R,CHIP 33H 5% 1/10W
R73WR	40AA3137	R,CHIP 33H 5% 1/10W
R73XB	40AA3137	R,CHIP 33H 5% 1/10W
R73XG	40AA3137	R,CHIP 33H 5% 1/10W
R73XR	40AA3137	R,CHIP 33H 5% 1/10W
R741B	401K5737	R,CARBON 470K 5% 1/6W
R741G	401K5737	R,CARBON 470K 5% 1/6W
R741R	401K5737	R,CARBON 470K 5% 1/6W
R742B	40AAD213	R,CHIP 47K 5% 1/2W
R742G	40AAD213	R,CHIP 47K 5% 1/2W
R742R	40AAD213	R,CHIP 47K 5% 1/2W
R743B	40AB3233	R,CHIP 330K 1% 1/10W
R743G	40AB3233	R,CHIP 330K 1% 1/10W
R743R	40AB3233	R,CHIP 330K 1% 1/10W
R744B	40AB3227	R,CHIP 180K 1% 1/10W
R744G	40AB3227	R,CHIP 180K 1% 1/10W
R744R	40AB3227	R,CHIP 180K 1% 1/10W
R745B	40AA3157	R,CHIP 220H 5% 1/10W
R745G	40AA3157	R,CHIP 220H 5% 1/10W
R745R	40AA3157	R,CHIP 220H 5% 1/10W
R746B	40AB3221	R,CHIP 100K 1% 1/10W
R746G	40AB3221	R,CHIP 100K 1% 1/10W
R746R	40AB3221	R,CHIP 100K 1% 1/10W
R747B	40AA3197	R,CHIP 10K 5% 1/10W
R747G	40AA3197	R,CHIP 10K 5% 1/10W
R747R	40AA3197	R,CHIP 10K 5% 1/10W
R748B	40AA3185	R,CHIP 3.3K 5% 1/10W
R748G	40AA3185	R,CHIP 3.3K 5% 1/10W
R748R	40AA3185	R,CHIP 3.3K 5% 1/10W

SYMBOL	PART NO	DESCRIPTION
R749B	40AB3219	R,CHIP 82K 1% 1/10W
R749G	40AB3219	R,CHIP 82K 1% 1/10W
R749R	40AB3219	R,CHIP 82K 1% 1/10W
R74AB	40AB3205	R,CHIP 22K 1% 1/10W
R74AG	40AB3205	R,CHIP 22K 1% 1/10W
R74AR	40AB3205	R,CHIP 22K 1% 1/10W
R74EB	40AB3211	R,CHIP 39K 1% 1/10W
R74EG	40AB3211	R,CHIP 39K 1% 1/10W
R74ER	40AB3211	R,CHIP 39K 1% 1/10W
R74FB	40AB3222	R,CHIP 110K 1% 1/10W
R74FG	40AB3222	R,CHIP 110K 1% 1/10W
R74FR	40AB3222	R,CHIP 110K 1% 1/10W
R74GB	40AAD213	R,CHIP 47K 5% 1/2W
R74GG	40AAD213	R,CHIP 47K 5% 1/2W
R74GR	40AAD213	R,CHIP 47K 5% 1/2W
R751	40AA3173	R,CHIP 1.0K 5% 1/10W
R752	40AA3149	R,CHIP 100H 5% 1/10W
R753	40AA3149	R,CHIP 100H 5% 1/10W
R771	40AA3197	R,CHIP 10K 5% 1/10W
R772	40AA3193	R,CHIP 6.8K 5% 1/10W
R773	40AA3173	R,CHIP 1.0K 5% 1/10W
R774	40AA3169	R,CHIP 680H 5% 1/10W
R775	40AA3195	R,CHIP 8.2K 5% 1/10W
R781	40AA3167	R,CHIP 560H 5% 1/10W
R782	40AA3209	R,CHIP 33K 5% 1/10W
R783	40AA1245	R,CHIP 1.0M 5% 1/8W
R784	40AA3231	R,CHIP 270K 5% 1/10W
R785	40AA3242	R,CHIP 750K 5% 1/10W
R786	40AA3242	R,CHIP 750K 5% 1/10W
R787	40AA3233	R,CHIP 330K 5% 1/10W
R791	40AB3173	R,CHIP 1.0K 1% 1/10W
R792	40AA3149	R,CHIP 100H 5% 1/10W
R793	40AA3149	R,CHIP 100H 5% 1/10W
R794	40AA3157	R,CHIP 220H 5% 1/10W
R795B	40AA3157	R,CHIP 220H 5% 1/10W
R795G	40AA3157	R,CHIP 220H 5% 1/10W
R795R	40AA3157	R,CHIP 220H 5% 1/10W
R79A	40AA3181	R,CHIP 2.2K 5% 1/10W
R79E	40AA3197	R,CHIP 10K 5% 1/10W
R79F	40AA3187	R,CHIP 3.9K 5% 1/10W
R79G	40AA3173	R,CHIP 1.0K 5% 1/10W
R79H	40AA3197	R,CHIP 10K 5% 1/10W
R79K	40AA3213	R,CHIP 47K 5% 1/10W
R79L	40AA3189	R,CHIP 4.7K 5% 1/10W
R79M	40AA3197	R,CHIP 10K 5% 1/10W
R79N	40AA3205	R,CHIP 22K 5% 1/10W
R79P	40AA3213	R,CHIP 47K 5% 1/10W
R79R	40AA3213	R,CHIP 47K 5% 1/10W

SYMBOL	PART NO	DESCRIPTION
R79T	40AA3197	R,CHIP 10K 5% 1/10W
R79U	40AA3197	R,CHIP 10K 5% 1/10W
R79W	40AA3181	R,CHIP 2.2K 5% 1/10W
R7A1	40AA3173	R,CHIP 1.0K 5% 1/10W
R7A2	40AB3187	R,CHIP 3.9K 1% 1/10W
R7A3	40AB3181	R,CHIP 2.2K 1% 1/10W
R7A7	40AA3173	R,CHIP 1.0K 5% 1/10W
R7A8	40AA3169	R,CHIP 680H 5% 1/10W
R7A9	40AA3212	R,CHIP 43K 5% 1/10W
R7AG	40AB3214	R,CHIP 51K 1% 1/10W
R7AH	40AA3169	R,CHIP 680H 5% 1/10W
R7AK	40AA3169	R,CHIP 680H 5% 1/10W
R7AL	40AA3159	R,CHIP 270H 5% 1/10W
R7AM	40AA3159	R,CHIP 270H 5% 1/10W
R7E2	40AA2167	R,CHIP 560H 5% 1/4W
R7E3	40AA3181	R,CHIP 2.2K 5% 1/10W
R7E4	40372169	R,METAL 680H 5% 2W
R7E5	404K5125	R,METAL 10H 5% 1/4W
R7E6	40AA2189	R,CHIP 4.7K 5% 1/4W
R7E7	40AA2195	R,CHIP 8.2K 5% 1/4W
R7F1	40AA3000	R,CHIP 0.0H 5% 1/10W
R7F2	40AA3177	R,CHIP 1.5K 5% 1/10W
R7F5	40371103	R,METAL 1.2H 5% 1W
R7G1	40AA3185	R,CHIP 3.3K 5% 1/10W
R7G2	40AA3185	R,CHIP 3.3K 5% 1/10W
R7G3	40AA3209	R,CHIP 33K 5% 1/10W
R7G4	40AA3209	R,CHIP 33K 5% 1/10W
R7G6	40AB3229	R,CHIP 220K 1% 1/10W
R7G7	40AA3221	R,CHIP 100K 5% 1/10W
R7G8	40AA3199	R,CHIP 12K 5% 1/10W
R7G9	40AB3185	R,CHIP 3.3K 1% 1/10W
R7GA	40AA3209	R,CHIP 33K 5% 1/10W
R7GE	40AA3209	R,CHIP 33K 5% 1/10W
R7GF	40AA3185	R,CHIP 3.3K 5% 1/10W
R7GG	40AA3181	R,CHIP 2.2K 5% 1/10W
R7GH	40AA3227	R,CHIP 180K 5% 1/10W
R7GJ	40AA3199	R,CHIP 12K 5% 1/10W
R7GK	40AB3229	R,CHIP 220K 1% 1/10W
R7GL	40AB3185	R,CHIP 3.3K 1% 1/10W
R7GM	40AA3199	R,CHIP 12K 5% 1/10W
R7GN	40AA3221	R,CHIP 100K 5% 1/10W
R7GP	40AA3209	R,CHIP 33K 5% 1/10W
R7GR	40AA3209	R,CHIP 33K 5% 1/10W
R7GT	40AA3185	R,CHIP 3.3K 5% 1/10W
R7GW	40AA3181	R,CHIP 2.2K 5% 1/10W
R7GX	40AA3227	R,CHIP 180K 5% 1/10W
R7GY	40AA3199	R,CHIP 12K 5% 1/10W
R7K1	40AA3192	R,CHIP 6.2K 5% 1/10W

SYMBOL	PART NO	DESCRIPTION
R7K2	40AAD211	R,CHIP 39K 5% 1/2W
R7K3	40AA3197	R,CHIP 10K 5% 1/10W
R7K4	40AA3000	R,CHIP 0.0H 5% 1/10W
R7K5	40AA3197	R,CHIP 10K 5% 1/10W
R7Y1	40AA3233	R,CHIP 330K 5% 1/10W
R7Y2	40AA3161	R,CHIP 330H 5% 1/10W
R7Y3	40AA3185	R,CHIP 3.3K 5% 1/10W
R7Y4	40AA3233	R,CHIP 330K 5% 1/10W
R7Y5	40AA3161	R,CHIP 330H 5% 1/10W
R7Y6	40AA3185	R,CHIP 3.3K 5% 1/10W
R7Y7	40AA3233	R,CHIP 330K 5% 1/10W
R7Y8	40AA3161	R,CHIP 330H 5% 1/10W
R7Y9	40AA3185	R,CHIP 3.3K 5% 1/10W
R7YA	40AA3233	R,CHIP 330K 5% 1/10W
R7YE	40AA3161	R,CHIP 330H 5% 1/10W
R7YF	40AA3185	R,CHIP 3.3K 5% 1/10W
R801	40AA3179	R,CHIP 1.8K 5% 1/10W
R802	40AA3179	R,CHIP 1.8K 5% 1/10W
R803	40AA3000	R,CHIP 0.0H 5% 1/10W
R804	40AA3000	R,CHIP 0.0H 5% 1/10W
R805	40AA3000	R,CHIP 0.0H 5% 1/10W
R806	40AA3000	R,CHIP 0.0H 5% 1/10W
R807	40AA3000	R,CHIP 0.0H 5% 1/10W
R808	40AA3000	R,CHIP 0.0H 5% 1/10W
R809	40AA3000	R,CHIP 0.0H 5% 1/10W
R80A	40AA3173	R,CHIP 1.0K 5% 1/10W
R80E	40AA3000	R,CHIP 0.0H 5% 1/10W
R80F	40AA3000	R,CHIP 0.0H 5% 1/10W
R80H	40AA3000	R,CHIP 0.0H 5% 1/10W
R80J	40AA3173	R,CHIP 1.0K 5% 1/10W
R80K	40AA3173	R,CHIP 1.0K 5% 1/10W
R810	40AA3173	R,CHIP 1.0K 5% 1/10W
R811	40AA3173	R,CHIP 1.0K 5% 1/10W
R812	40AA3000	R,CHIP 0.0H 5% 1/10W
R813	40AA3125	R,CHIP 10H 5% 1/10W
R814	40AA3125	R,CHIP 10H 5% 1/10W
R815	40AA3125	R,CHIP 10H 5% 1/10W
R818	40AA3173	R,CHIP 1.0K 5% 1/10W
R819	40AA3173	R,CHIP 1.0K 5% 1/10W
R821	40AA3000	R,CHIP 0.0H 5% 1/10W
R822	40AA3173	R,CHIP 1.0K 5% 1/10W
R823	40AA3207	R,CHIP 27K 5% 1/10W
R826	40AA3205	R,CHIP 22K 5% 1/10W
R827	40AA3000	R,CHIP 0.0H 5% 1/10W
R82A	40AA3000	R,CHIP 0.0H 5% 1/10W
R831	40AA3173	R,CHIP 1.0K 5% 1/10W
R832	40AA3189	R,CHIP 4.7K 5% 1/10W
R852	40AA3177	R,CHIP 1.5K 5% 1/10W

SYMBOL	PART NO	DESCRIPTION
R855	40AA3209	R,CHIP 33K 5% 1/10W
R857	40AA3209	R,CHIP 33K 5% 1/10W
R859	40AA3221	R,CHIP 100K 5% 1/10W
R85A	40AA3167	R,CHIP 560H 5% 1/10W
R85E	40AA3000	R,CHIP 0.0H 5% 1/10W
R85F	40AA3000	R,CHIP 0.0H 5% 1/10W
R85H	40AAD149	R,CHIP 100H 5% 1/2W
R85K	40AB3203	R,CHIP 18K 1% 1/10W
R85L	40AB3215	R,CHIP 56K 1% 1/10W
R85M	40AA3000	R,CHIP 0.0H 5% 1/10W
R85N	40AA3173	R,CHIP 1.0K 5% 1/10W
R8A1	40AA3207	R,CHIP 27K 5% 1/10W
R8A2	40AAD146	R,CHIP 75H 5% 1/2W
R8A3	40AA3213	R,CHIP 47K 5% 1/10W
R8A4	40AAD146	R,CHIP 75H 5% 1/2W
R8A5	40AA3197	R,CHIP 10K 5% 1/10W
R8A6	40AA3197	R,CHIP 10K 5% 1/10W
R8A7	40AA3197	R,CHIP 10K 5% 1/10W
R8A8	40AA3213	R,CHIP 47K 5% 1/10W
R8A9	40AAD151	R,CHIP 120H 5% 1/2W
R8AA	40AA3209	R,CHIP 33K 5% 1/10W
R8AE	40AA3173	R,CHIP 1.0K 5% 1/10W
R8AF	40AA3173	R,CHIP 1.0K 5% 1/10W
R8AH	40AA3209	R,CHIP 33K 5% 1/10W
R8AJ	40AA3179	R,CHIP 1.8K 5% 1/10W
R8GE	40372113	R,METAL 3.3H 5% 2W
R8M1B	40AA3161	R,CHIP 330H 5% 1/10W
R8M1G	40AA3161	R,CHIP 330H 5% 1/10W
R8M1R	40AA3161	R,CHIP 330H 5% 1/10W
R8M2B	40AA2177	R,CHIP 1.5K 5% 1/4W
R8M2G	40AA2177	R,CHIP 1.5K 5% 1/4W
R8M2R	40AA2177	R,CHIP 1.5K 5% 1/4W
R8M4B	40AA3153	R,CHIP 150H 5% 1/10W
R8M4G	40AA3153	R,CHIP 150H 5% 1/10W
R8M4R	40AA3153	R,CHIP 150H 5% 1/10W
R8M5	40AA3149	R,CHIP 100H 5% 1/10W
R8M6	40AA3149	R,CHIP 100H 5% 1/10W
R8M7	40AA3149	R,CHIP 100H 5% 1/10W
R8M8	40AA3149	R,CHIP 100H 5% 1/10W
R8M9	40AA3149	R,CHIP 100H 5% 1/10W
R8MA	40AA3245	R,CHIP 1.0M 5% 1/10W
R8MC	40AB3179	R,CHIP 1.8K 1% 1/10W
R8ME	40AB3200	R,CHIP 13K 1% 1/10W
R8MFB	40AA2161	R,CHIP 330H 5% 1/4W
R8MFG	40AA2161	R,CHIP 330H 5% 1/4W
R8MFR	40AA2161	R,CHIP 330H 5% 1/4W
R8MH	40AA3173	R,CHIP 1.0K 5% 1/10W
R8N2	40AB3164	R,CHIP 430H 1% 1/10W

SYMBOL	PART NO	DESCRIPTION
R8N3	40AB3212	R,CHIP 43K 1% 1/10W
R8N4	40AB3189	R,CHIP 4.7K 1% 1/10W
R8NT	40AA3173	R,CHIP 1.0K 5% 1/10W
R8NW	40AA3000	R,CHIP 0.0H 5% 1/10W
R8NX	40AA3000	R,CHIP 0.0H 5% 1/10W
R8P2	40AB3163	R,CHIP 390H 1% 1/10W
R8P3	40AB3215	R,CHIP 56K 1% 1/10W
R8P4	40AB3189	R,CHIP 4.7K 1% 1/10W
R8P5	40AB3169	R,CHIP 680H 1% 1/10W
R8P6	40AB3154	R,CHIP 160H 1% 1/10W
R8P8	40AA3185	R,CHIP 3.3K 5% 1/10W
R8P9	40AA3185	R,CHIP 3.3K 5% 1/10W
R8PA	40371105	R,METAL 1.5H 5% 1W
R8PE	40371157	R,METAL 220H 5% 1W
R8PG	40AB3171	R,CHIP 820H 1% 1/10W
R8PH	40AB3154	R,CHIP 160H 1% 1/10W
R8PM	40AA3185	R,CHIP 3.3K 5% 1/10W
R8PN	40AA3185	R,CHIP 3.3K 5% 1/10W
R8PP	40371157	R,METAL 220H 5% 1W
R8PR	40371105	R,METAL 1.5H 5% 1W
R8PT	40AA3173	R,CHIP 1.0K 5% 1/10W
R8R1	40AA3207	R,CHIP 27K 5% 1/10W
R8R2	40AA3197	R,CHIP 10K 5% 1/10W
R8R5	40AA3147	R,CHIP 82H 5% 1/10W
R8R6	40AA3000	R,CHIP 0.0H 5% 1/10W
R8R7	40AA3147	R,CHIP 82H 5% 1/10W
R8R8	40AA3000	R,CHIP 0.0H 5% 1/10W
R8U1	40AA3137	R,CHIP 33H 5% 1/10W
R8U2	40AA3137	R,CHIP 33H 5% 1/10W
R8U3	40AA3185	R,CHIP 3.3K 5% 1/10W
R8U4	40AA3181	R,CHIP 2.2K 5% 1/10W
R8U5	40AA3197	R,CHIP 10K 5% 1/10W
R8U6	40AA3197	R,CHIP 10K 5% 1/10W
R8U7	40AA3197	R,CHIP 10K 5% 1/10W
R8U8	40AA3197	R,CHIP 10K 5% 1/10W
R8U9	40AA3197	R,CHIP 10K 5% 1/10W
R8UA	40AA3197	R,CHIP 10K 5% 1/10W
R8UF	40AA3173	R,CHIP 1.0K 5% 1/10W
R8UG	40AA3149	R,CHIP 100H 5% 1/10W
R8UH	40AA3149	R,CHIP 100H 5% 1/10W
R8W3	40AA3137	R,CHIP 33H 5% 1/10W
R8W4	40AA3137	R,CHIP 33H 5% 1/10W
R8W5	40AA3177	R,CHIP 1.5K 5% 1/10W
R8W6	40AA3177	R,CHIP 1.5K 5% 1/10W
R8W7	40AA3177	R,CHIP 1.5K 5% 1/10W
R8W8	40AA3177	R,CHIP 1.5K 5% 1/10W
R8W9	40AA3177	R,CHIP 1.5K 5% 1/10W
R8WA	40AA3177	R,CHIP 1.5K 5% 1/10W

SYMBOL	PART NO	DESCRIPTION
R8WE	40AA3177	R,CHIP 1.5K 5% 1/10W
R8WF	40AA3177	R,CHIP 1.5K 5% 1/10W
R8X3	40AA3000	R,CHIP 0.0H 5% 1/10W
R8X4	40AA3000	R,CHIP 0.0H 5% 1/10W
R901B	40AA3139	R,CHIP 39H 5% 1/10W
R901G	40AA3139	R,CHIP 39H 5% 1/10W
R901R	40AA3139	R,CHIP 39H 5% 1/10W
R902B	401C6629	R,CARBON 15H 5% 1/4W
R902G	401C6629	R,CARBON 15H 5% 1/4W
R902R	401C6629	R,CARBON 15H 5% 1/4W
R903	401C6649	R,CARBON 100H 5% 1/4W
R904	40AAD133	R,CHIP 22H 5% 1/2W
R905	401C6689	R,CARBON 4.7K 5% 1/4W
R951	40AA3197	R,CHIP 10K 5% 1/10W
R952	40AA3173	R,CHIP 1.0K 5% 1/10W
R953	40AA3173	R,CHIP 1.0K 5% 1/10W
R983	40499449	R,METAL 10K 2% 1W
R984	40AB1171	R,CHIP 820H 1% 1/8W
R985	401G6141	R,CARBON 47H 5% 1/4W
R986	401G6141	R,CARBON 47H 5% 1/4W
R989	404J9477	R,METAL 68H 5% 2W
R990	40AA3233	R,CHIP 330K 5% 1/10W
R991	40372215	R,METAL 56K 5% 2W
R992	40AB3169	R,CHIP 680H 1% 1/10W
R993	40AA5193	R,CHIP 6.8K 5% 1/4W
R994	404K5125	R,METAL 10H 5% 1/4W
R995	401H5677	R,CARBON 1.5K 5% 1/2W

*** CAPACITORS ***

C151	42AA2744	C,CERAMIC 25V 0.1UF
C153	42AA2744	C,CERAMIC 25V 0.1UF
C2001	430C8715	C,ELEC 50V 22UF
C2002	430C8519	C,ELEC 25V 100UF
C401	430C8722	C,ELEC 50V 330UF
C402	42AA2744	C,CERAMIC 25V 0.1UF
C403	430C8721	C,ELEC 50V 220UF
C404	430C8721	C,ELEC 50V 220UF
C405	430C8722	C,ELEC 50V 330UF
C406	42AA2744	C,CERAMIC 25V 0.1UF
C407	428D4417	C,METAL FILM 250V 0.22UF
C421	42AA2744	C,CERAMIC 25V 0.1UF
C422	42AA2744	C,CERAMIC 25V 0.1UF
C423	427A7066	C,FILM 100V 0.018UF 5%
C424	42CA1458	C,CERAMIC 50V 560PF
C425	42CA1446	C,CERAMIC 50V 180PF
C426	42CA1450	C,CERAMIC 50V 270PF
C427	430C8522	C,ELEC 25V 330UF
C428	430C8522	C,ELEC 25V 330UF

SYMBOL	PART NO	DESCRIPTION
C429	42CA1424	C,CERAMIC 50V 22PF
C471	42AA2726	C,CERAMIC 50V 0.01UF
C472	430C8711	C,ELEC 50V 4.7UF
C473	430C8711	C,ELEC 50V 4.7UF
C481	430B9041	C,ELEC 25V 47UF
C482	42AA2744	C,CERAMIC 25V 0.1UF
C483	430C8423	C,ELEC 16V 470UF
C4H1	430B9041	C,ELEC 25V 47UF
C4H2	421D6009	C,CERAMIC 25V 0.1UF
C4H3	430C8711	C,ELEC 50V 4.7UF
C4H7	430C8711	C,ELEC 50V 4.7UF
C4J4	42AA2744	C,CERAMIC 25V 0.1UF
C4J6	42AA2744	C,CERAMIC 25V 0.1UF
C4J8	42AA2744	C,CERAMIC 25V 0.1UF
C4K1	42AA2744	C,CERAMIC 25V 0.1UF
C4K2	430B9044	C,ELEC 25V 330UF
C4K3	430B9044	C,ELEC 25V 330UF
C4K4	42AA2744	C,CERAMIC 25V 0.1UF
C4K5	42AA2744	C,CERAMIC 25V 0.1UF
C4P1	4309J248	C,ELEC 10V 3300UF
C502	430B9039	C,ELEC 25V 22UF
C503	42AA2744	C,CERAMIC 25V 0.1UF
C504	430B9039	C,ELEC 25V 22UF
C505	42AA2744	C,CERAMIC 25V 0.1UF
C506	42CA1472	C,CERAMIC 50V 2200PF
C507	430C8423	C,ELEC 16V 470UF
C508	433A7014	C,ELEC 16V 100UF
C509	430B9041	C,ELEC 25V 47UF
C510	427F4669	C,FILM 50V 0.033UF
C511	430C8423	C,ELEC 16V 470UF
C512	42AA2744	C,CERAMIC 25V 0.1UF
C513	42AA1521	C,CHIP CERAMIC 50V 0.01UF
C514	42AA2744	C,CERAMIC 25V 0.1UF
C515	430C8419	C,ELEC 16V 100UF
C516	42AA2744	C,CERAMIC 25V 0.1UF
C517	430C8419	C,ELEC 16V 100UF
C518	42AA2744	C,CERAMIC 25V 0.1UF
C519	42AA2744	C,CERAMIC 25V 0.1UF
C51A	42AA2744	C,CERAMIC 25V 0.1UF
C520	42AA1521	C,CHIP CERAMIC 50V 0.01UF
C522	42AA1521	C,CHIP CERAMIC 50V 0.01UF
C523	42AA1521	C,CHIP CERAMIC 50V 0.01UF
C524	42AA2744	C,CERAMIC 25V 0.1UF
C52A	42AA2744	C,CERAMIC 25V 0.1UF
C52C	430B9041	C,ELEC 25V 47UF
C52E	42AA2744	C,CERAMIC 25V 0.1UF
C52G	42AA2744	C,CERAMIC 25V 0.1UF
C52J	430B9041	C,ELEC 25V 47UF

SYMBOL	PART NO	DESCRIPTION
C52K	42AA2744	C,CERAMIC 25V 0.1UF
C52L	42AA2744	C,CERAMIC 25V 0.1UF
C52M	430B9041	C,ELEC 25V 47UF
C52N	42AA2744	C,CERAMIC 25V 0.1UF
C52P	430B9041	C,ELEC 25V 47UF
C52T	42AA2744	C,CERAMIC 25V 0.1UF
C532	42AA2744	C,CERAMIC 25V 0.1UF
C533	430C8417	C,ELEC 16V 47UF
C54A	42AA1535	C,CERAMIC 25V 0.047UF
C552	4303H527	C,ELEC 25V 2200UF
C554	420C9571	C,CERAMIC 500V 4700PF
C561	42818327	C,METAL 2.0KV 4600PF 3%
C562	433A7014	C,ELEC 16V 100UF
C56A	430C6582	C,ELEC 50V 10UF
C56C	430C6582	C,ELEC 50V 10UF
C56E	42AA2744	C,CERAMIC 25V 0.1UF
C571	42AA2744	C,CERAMIC 25V 0.1UF
C573	42816384	C,FILM 250V 0.62UF 5%
C574	42816381	C,FILM 250V 0.36UF 5%
C575	42816376	C,FILM 250V 0.11UF 5%
C576	42816357	C,FILM 250V 0.27UF 5%
C577	42816367	C,FILM 250V 1.5UF 5%
C578	42816364	C,FILM 250V 0.82UF 5%
C579	42816351	C,FILM 250V 0.10UF 5%
C57A	42816351	C,FILM 250V 0.10UF 5%
C57C	420C9066	C,CERAMIC 500V 1800PF
C57E	42AA1538	C,CERAMIC 25V 0.1UF
C57F	42AA1538	C,CERAMIC 25V 0.1UF
C57H	42AA1538	C,CERAMIC 25V 0.1UF
C57J	42AA1538	C,CERAMIC 25V 0.1UF
C57K	42AA1538	C,CERAMIC 25V 0.1UF
C57M	42AA1538	C,CERAMIC 25V 0.1UF
C57N	430C6537	C,ELEC 16V 330UF
C57P	430C6582	C,ELEC 50V 10UF
C57R	42816349	C,FILM 250V 0.068UF 5%
C57T	430B6041	C,ELEC 25V 47UF
C57W	430F1113	C,ELEC 16V 100UF
C57X	42AA1538	C,CERAMIC 25V 0.1UF
C581	430C6520	C,ELEC 10V 220UF
C582	433A4026	C,ELEC 16V 100UF
C591	42AA2744	C,CERAMIC 25V 0.1UF
C592	430B9553	C,ELEC 250V 2.2UF
C593	420C9567	C,CERAMIC 500V 2200PF
C595	427F4617	C,FILM 50V 0.022UF
C596	430C6582	C,ELEC 50V 10UF
C597	430B6041	C,ELEC 25V 47UF
C598	42CA1454	C,CERAMIC 50V 390PF
C59C	42AA2744	C,CERAMIC 25V 0.1UF

SYMBOL	PART NO	DESCRIPTION
C59E	42AA2744	C,CERAMIC 25V 0.1UF
C59F	430B6041	C,ELEC 25V 47UF
C59H	430C6551	C,ELEC 25V 100UF
C59L	430C6582	C,ELEC 50V 10UF
C5A1	42AA2744	C,CERAMIC 25V 0.1UF
C5A2	42AA2744	C,CERAMIC 25V 0.1UF
C5A3	433A7046	C,ELEC 50V 10UF
C5A4	427F4687	CQ93M1H151J,BT
C5A5	427F4621	C,FILM 50V 0.047UF
C5A6	4302J556	C,ELEC 250V 10UF
C5A7	428D0097	C,FILM 250V 0.22UF
C5A8	427F4625	C,FILM 50V 0.1UF
C5A9	430C6552	C,ELEC 25V 220UF
C5AC	430C6552	C,ELEC 25V 220UF
C5E1	430B9096	C,ELEC 100V 3.3UF
C5E2	428D0053	C,METAL 100V 0.1UF
C5E3	42CA1464	C,CERAMIC 50V 1000PF
C5F1	430B9016	C,ELEC 10V 100UF
C5F2	433A7002	C,ELEC 10V 47UF
C5F3	430B9016	C,ELEC 10V 100UF
C5F4	42AA2744	C,CERAMIC 25V 0.1UF
C5F5	42AA2744	C,CERAMIC 25V 0.1UF
C5G1	4309J236	C,ELEC 350V 33UF
C5G2	428D5093	C,METAL 250V 0.1UF
C5G3	4302J558	C,ELEC 250V 33UF
C5G5	428D5093	C,METAL 250V 0.1UF
C5GA	430C6584	C,ELEC 50V 33UF
C5GE	42AA2726	C,CERAMIC 50V 0.01UF
C5GF	430B6028	C,ELEC 16V 47UF
C5GH	430C6581	C,ELEC 50V 4.7UF
C5GK	42AA2744	C,CERAMIC 25V 0.1UF
C5P1	430B9041	C,ELEC 25V 47UF
C5P2	42AA2744	C,CERAMIC 25V 0.1UF
C5R1	4309J196	C,ELEC 100V 120UF
C5R2	42898011	C,FILM 100V 2.2UF
C5R3	42826301	C,FILM 800V 1000PF
C5R4	42703464	C,FILM 630V 0.012UF
C5T2	427F4625	C,FILM 50V 0.1UF
C5U1	427F4625	C,FILM 50V 0.1UF
C5W2	42AA1538	C,CERAMIC 25V 0.1UF
C5W4	430B6062	C,ELEC 50V 2.2UF
C5W5	427F4617	C,FILM 50V 0.022UF
C5W6	42CA1452	C,CHIP 50V 330PF
C5W7	430B6028	C,ELEC 16V 47UF
C5W8	42AA2744	C,CERAMIC 25V 0.1UF
C5X1	430C8152	C,ELEC 160V 10UF
C5X2	430C6631	C,ELEC 160V 3.3UF
C5X3	42AA2726	C,CERAMIC 50V 0.01UF

SYMBOL	PART NO	DESCRIPTION
C607	42AA2721	C,CERAMIC 50V 0.1UF
C608	42060330	C,CERAMIC 400V 2200PF
C609	43109896	C,ELEC 400V 330UF
C610	43109896	C,ELEC 400V 330UF
C611	428D0225	C,METAL 630V 0.022UF
C621	430C9502	C,ELEC 35V 220UF
C622	42899196	C,METAL 1.25KV 1000PF 3%
C623	430C9502	C,ELEC 35V 220UF
C624	430C8152	C,ELEC 160V 10UF
C625	42CA1456	C,CERAMIC 50V 470PF
C651	430B9066	C,ELEC 50V 22UF
C652	42AA2721	C,CERAMIC 50V 0.1UF
C653	430B9041	C,ELEC 25V 47UF
C654	42AA2721	C,CERAMIC 50V 0.1UF
C655	420J8061	C,CERAMIC 560PF 1KV10%-AT
C656	420J8052	C,CERAMIC 100PF1KV10%,AT
C658	430B6068	C,ELEC 50V 47UF
C659	427F4625	C,FILM 50V 0.1UF
C660	428D0081	C,METAL 250V 0.01UF
C671	430C9503	C,ELEC 100V 47UF
C672	428D6011	C,METAL 100V 0.15UF
C673	428D6009	C,METAL 100V 0.1UF
C674	430C6614	C,ELEC 100V 1UF
C6A1	43099262	C,ELEC 300V 220UF
C6A2	43036674	C,ELEC 315V 22UF
C6E1	4302J104	C,ELEC 100V 330UF
C6E2	4302F102	C,ELEC 100V 100UF
C6E3	4302J104	C,ELEC 100V 330UF
C6F1	4302J047	C,ELEC 25V 2200UF
C6F2	4302J047	C,ELEC 25V 2200UF
C6F3	430C6554	C,ELEC 25V 470UF
C6G2	4302J047	C,ELEC 25V 2200UF
C6H1	4302J047	C,ELEC 25V 2200UF
C6H2	430C6554	C,ELEC 25V 470UF
C6K1	430B9020	C,ELEC 10V 1000UF
C6K2	430C6535	C,ELEC 16V 100UF
C6L1	430CH627	C,ELEC 35V 2200UF
C6L2	430B6056	C,ELEC 35V 330UF
C6L4	420J8061	C,CERAMIC 560PF 1KV10%-AT
C6M1	430CH627	C,ELEC 35V 2200UF
C6M2	430B6056	C,ELEC 35V 330UF
C6M4	420J8061	C,CERAMIC 560PF 1KV10%-AT
C6P1	430C6601	C,ELEC 63V 10UF
C6P2	421C3479	C,CERAMIC 50V 0.1UF
C6T1	42826201	C,FILM 250V 0.1UF
C6T2	420EJ013	C,CERAMIC 400V 1000PF
C6T3	420EJ013	C,CERAMIC 400V 1000PF
C6T4	42826201	C,FILM 250V 0.1UF

SYMBOL	PART NO	DESCRIPTION
C6V1	430C8523	C,ELEC 25V 470UF
C6V2	421C3479	C,CERAMIC 50V 0.1UF
C6V3	421C3479	C,CERAMIC 50V 0.1UF
C6V4	421C3479	C,CERAMIC 50V 0.1UF
C6Y1	42845181	C,FILM 400V 0.47UF
C6Y2	42839865	C,METAL FILM 400V 0.47UF
C701B	433A6148	C,ELEC 16V 100UF
C701G	433A6148	C,ELEC 16V 100UF
C701R	433A6148	C,ELEC 16V 100UF
C702B	42AA2726	C,CERAMIC 50V 0.01UF
C702G	42AA2726	C,CERAMIC 50V 0.01UF
C702R	42AA2726	C,CERAMIC 50V 0.01UF
C703B	433A6148	C,ELEC 16V 100UF
C703G	433A6148	C,ELEC 16V 100UF
C703R	433A6148	C,ELEC 16V 100UF
C704B	42AA2726	C,CERAMIC 50V 0.01UF
C704G	42AA2726	C,CERAMIC 50V 0.01UF
C704R	42AA2726	C,CERAMIC 50V 0.01UF
C705	428B3513	C,METAL FILM 50V 0.1UF
C706	433A6143	C,ELEC 16V 10UF
C707	428B3513	C,METAL FILM 50V 0.1UF
C708	433A6143	C,ELEC 16V 10UF
C709	430B8144	C,ELEC 16V 47UF
C711B	433A6180	C,ELEC 50V 3.3UF
C711G	433A6180	C,ELEC 50V 3.3UF
C711R	433A6180	C,ELEC 50V 3.3UF
C712B	42AA2726	C,CERAMIC 50V 0.01UF
C712G	42AA2726	C,CERAMIC 50V 0.01UF
C712R	42AA2726	C,CERAMIC 50V 0.01UF
C713B	430J9184	C,ELEC 16V 100UF
C713G	430J9184	C,ELEC 16V 100UF
C713R	430J9184	C,ELEC 16V 100UF
C714B	42AA2744	C,CERAMIC 25V 0.1UF
C714G	42AA2744	C,CERAMIC 25V 0.1UF
C714R	42AA2744	C,CERAMIC 25V 0.1UF
C715	430C6537	C,ELEC 16V 330UF
C716	42AA2744	C,CERAMIC 25V 0.1UF
C717	430C0244	C,ELEC 16V 47UF
C718	42AA2744	C,CERAMIC 25V 0.1UF
C71AB	42AA2744	C,CERAMIC 25V 0.1UF
C71AG	42AA2744	C,CERAMIC 25V 0.1UF
C71AR	42AA2744	C,CERAMIC 25V 0.1UF
C71E	42AA2744	C,CERAMIC 25V 0.1UF
C71FB	430C8417	C,ELEC 16V 47UF
C71FG	430C8417	C,ELEC 16V 47UF
C71FR	430C8417	C,ELEC 16V 47UF
C721B	42AA1538	C,CERAMIC 25V 0.1UF
C721G	42AA1538	C,CERAMIC 25V 0.1UF

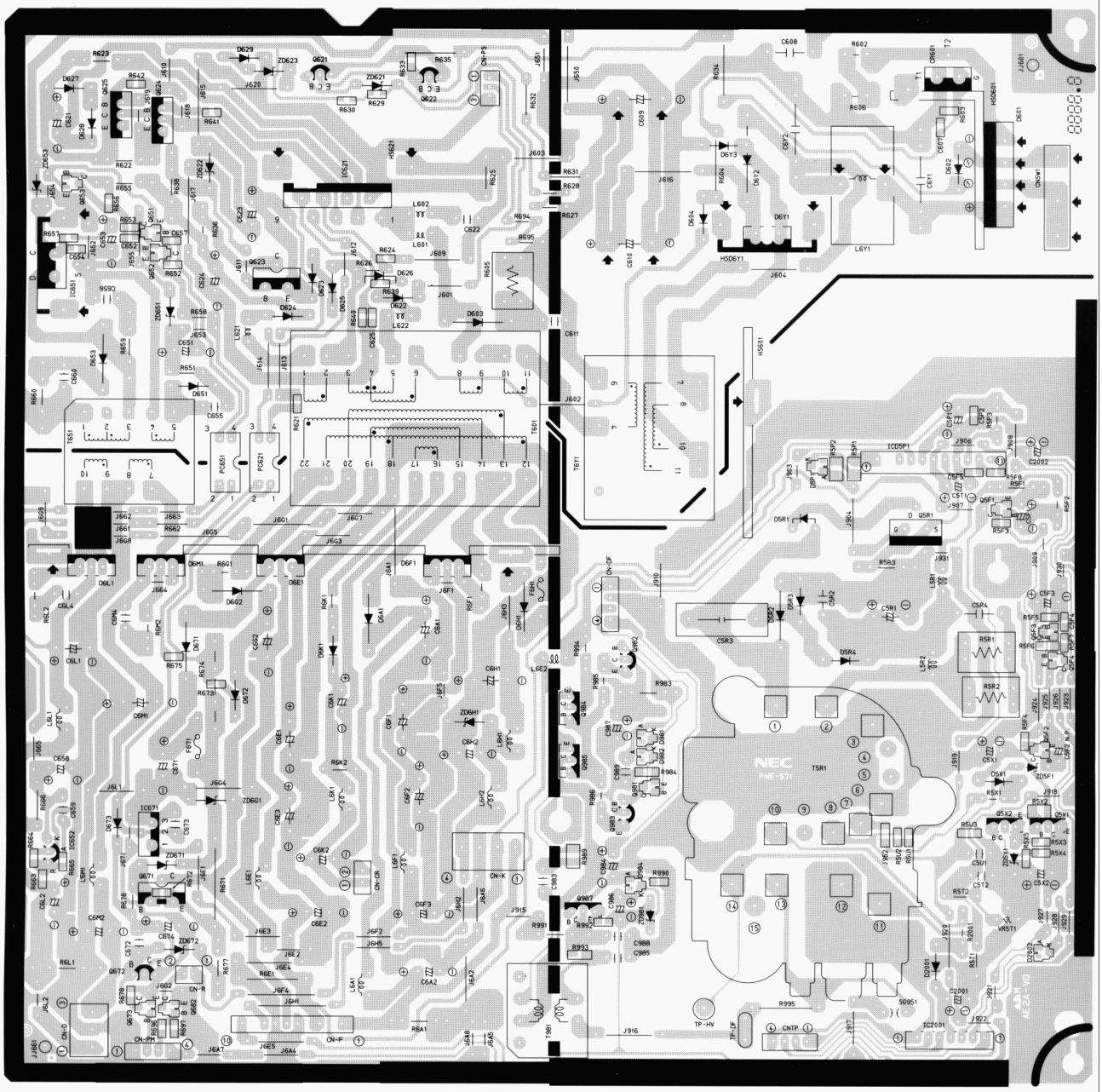
SYMBOL	PART NO	DESCRIPTION
C721R	42AA1538	C,CERAMIC 25V 0.1UF
C722B	42CA1448	C,CERAMIC 50V 220PF
C722G	42CA1448	C,CERAMIC 50V 220PF
C722R	42CA1448	C,CERAMIC 50V 220PF
C723B	42CA1426	C,CERAMIC 50V 27PF
C723G	42CA1426	C,CERAMIC 50V 27PF
C723R	42CA1426	C,CERAMIC 50V 27PF
C725	42AA2744	C,CERAMIC 25V 0.1UF
C726	430C8421	C,ELEC 16V 220UF
C727	428C9002	C,METAL FILM 100V 0.1UF
C728	430C6621	C,ELEC 100V 47UF
C729B	428D0097	C,FILM 250V 0.22UF
C729G	428D0097	C,FILM 250V 0.22UF
C729R	428D0097	C,FILM 250V 0.22UF
C731	430C0244	C,ELEC 16V 47UF
C731A	42AA2744	C,CERAMIC 25V 0.1UF
C732B	42AA2744	C,CERAMIC 25V 0.1UF
C732G	42AA2744	C,CERAMIC 25V 0.1UF
C732R	42AA2744	C,CERAMIC 25V 0.1UF
C733B	42AA2744	C,CERAMIC 25V 0.1UF
C733G	42AA2744	C,CERAMIC 25V 0.1UF
C733R	42AA2744	C,CERAMIC 25V 0.1UF
C735	430J9184	C,ELEC 16V 100UF
C735A	42AA2744	C,CERAMIC 25V 0.1UF
C735E	42AA2744	C,CERAMIC 25V 0.1UF
C738	42AA2744	C,CERAMIC 25V 0.1UF
C739	42AA2744	C,CERAMIC 25V 0.1UF
C73A	430C0244	C,ELEC 16V 47UF
C73E	42AA2744	C,CERAMIC 25V 0.1UF
C73F	430B8179	C,ELEC 50V 10UF
C73H	430B8179	C,ELEC 50V 10UF
C741B	430B9552	C,ELEC 250V 1.0UF
C741G	430B9552	C,ELEC 250V 1.0UF
C741R	430B9552	C,ELEC 250V 1.0UF
C742B	42AA1521	C,CHIP CERAMIC 50V 0.01UF
C742G	42AA1521	C,CHIP CERAMIC 50V 0.01UF
C742R	42AA1521	C,CHIP CERAMIC 50V 0.01UF
C743B	428D0093	C,METALFILM 250V 0.1UF
C743G	428D0093	C,METALFILM 250V 0.1UF
C743R	428D0093	C,METALFILM 250V 0.1UF
C744B	427F4673	C,FILM 50V 0.068UF
C744G	427F4673	C,FILM 50V 0.068UF
C744R	427F4673	C,FILM 50V 0.068UF
C747	430C8355	C,ELEC 250V 10UF
C748	42AA2744	C,CERAMIC 25V 0.1UF
C751	42AA2744	C,CERAMIC 25V 0.1UF
C752	42AA2744	C,CERAMIC 25V 0.1UF
C764	430C8419	C,ELEC 16V 100UF

SYMBOL	PART NO	DESCRIPTION
C765	430C6536	C,ELEC 16V 220UF
C766	430C6535	C,ELEC 16V 100UF
C771	427F4675	C,FILM 50V 0.1UF
C772	430C6534	C,ELEC 16V 47UF
C773	430C8417	C,ELEC 16V 47UF
C781	430B6028	C,ELEC 16V 47UF
C783	430B9552	C,ELEC 250V 1.0UF
C791	42AA1505	C,CHIP CERAMIC 50V 470PF
C792	42AA1538	C,CERAMIC 25V 0.1UF
C793	430C0275	C,ELEC 50V 1.0UF
C794	42AA2744	C,CERAMIC 25V 0.1UF
C795	430J9184	C,ELEC 16V 100UF
C796	430C6535	C,ELEC 16V 100UF
C797	42AA2744	C,CERAMIC 25V 0.1UF
C79A	42CA1444	C,CERAMIC 50V 150PF
C79E	42CA1438	C,CERAMIC 50V 82PF
C79G	42AA1515	C,CHIP CERAMIC 50V 3300PF
C79H	42AA1509	C,CHIP CERAMIC 50V 1000PF
C7A1	42AA2744	C,CERAMIC 25V 0.1UF
C7A2	430C0278	C,ELEC 50V 4.7UF
C7A3	428B3511	C,METAL 50V 0.068UF
C7A4	430C0278	C,ELEC 50V 4.7UF
C7A5	430C0275	C,ELEC 50V 1.0UF
C7A8	42CA1448	C,CERAMIC 50V 220PF
C7A9	42AA2744	C,CERAMIC 25V 0.1UF
C7AA	430J9184	C,ELEC 16V 100UF
C7AE	42CA1440	C,CERAMIC 50V 100PF
C7AG	433A6520	C,ELEC 50V 1.0UF
C7E1	430C6586	C,ELEC 50V 100UF
C7E3	430C8417	C,ELEC 16V 47UF
C7E4	428D0097	C,FILM 250V 0.22UF
C7E7	430C6551	C,ELEC 25V 100UF
C7F1	430C8417	C,ELEC 16V 47UF
C7F2	42AA2744	C,CERAMIC 25V 0.1UF
C7F3	42AA2744	C,CERAMIC 25V 0.1UF
C7G1	42AA2744	C,CERAMIC 25V 0.1UF
C7G2	42AA1538	C,CERAMIC 25V 0.1UF
C7G3	42AA1538	C,CERAMIC 25V 0.1UF
C7G5	42AA2744	C,CERAMIC 25V 0.1UF
C7G6	42AA2744	C,CERAMIC 25V 0.1UF
C7GA	42CA1464	C,CERAMIC 50V 1000PF
C7GE	42AA2726	C,CERAMIC 50V 0.01UF
C7GF	42CA1436	C,CERAMIC 50V 68PF
C7GG	42CA1464	C,CERAMIC 50V 1000PF
C7GH	42AA2726	C,CERAMIC 50V 0.01UF
C7GJ	42CA1436	C,CERAMIC 50V 68PF
C7GK	42AA2744	C,CERAMIC 25V 0.1UF
C7K1	428D0081	C,METAL 250V 0.01UF

SYMBOL	PART NO	DESCRIPTION
C801	42AA2744	C,CERAMIC 25V 0.1UF
C802	430C6535	C,ELEC 16V 100UF
C808	42CA1416	C,CERAMIC 50V 10PF
C809	42CA1416	C,CERAMIC 50V 10PF
C811	42AA2744	C,CERAMIC 25V 0.1UF
C814	42AA2744	C,CERAMIC 25V 0.1UF
C816	42AA1509	C,CHIP CERAMIC 50V 1000PF
C817	42AA1509	C,CHIP CERAMIC 50V 1000PF
C818	42AA1509	C,CHIP CERAMIC 50V 1000PF
C852	42CA1428	C,CERAMIC 50V 33PF
C853	42CA1428	C,CERAMIC 50V 33PF
C854	42AA2744	C,CERAMIC 25V 0.1UF
C855	430B8145	C,ELEC 16V 100UF
C857	42AA2744	C,CERAMIC 25V 0.1UF
C85A	430B8179	C,ELEC 50V 10UF
C85E	42AA2744	C,CERAMIC 25V 0.1UF
C8A1	42AA2744	C,CERAMIC 25V 0.1UF
C8A2	430B8144	C,ELEC 16V 47UF
C8G3	42AA2744	C,CERAMIC 25V 0.1UF
C8G4	430C8417	C,ELEC 16V 47UF
C8G6	430B6028	C,ELEC 16V 47UF
C8G7	42AA2744	C,CERAMIC 25V 0.1UF
C8G8	42AA2744	C,CERAMIC 25V 0.1UF
C8G9	42AA2744	C,CERAMIC 25V 0.1UF
C8M1B	42AA2744	C,CERAMIC 25V 0.1UF
C8M1G	42AA2744	C,CERAMIC 25V 0.1UF
C8M1R	42AA2744	C,CERAMIC 25V 0.1UF
C8M2	42AA2744	C,CERAMIC 25V 0.1UF
C8M3	42AA2744	C,CERAMIC 25V 0.1UF
C8M4	42AA2744	C,CERAMIC 25V 0.1UF
C8M5	42CA1424	C,CERAMIC 50V 22PF
C8M6	42CA1424	C,CERAMIC 50V 22PF
C8M7	430B6028	C,ELEC 16V 47UF
C8M9	42AA2744	C,CERAMIC 25V 0.1UF
C8MA	430C8417	C,ELEC 16V 47UF
C8MF	430B6028	C,ELEC 16V 47UF
C8N9	42AA2744	C,CERAMIC 25V 0.1UF
C8P1	42CA1444	C,CERAMIC 50V 150PF
C8P2	42CA1444	C,CERAMIC 50V 150PF
C8P3	42AA2744	C,CERAMIC 25V 0.1UF
C8P4	42AA2744	C,CERAMIC 25V 0.1UF
C8P5	430B6042	C,ELEC 25V 100UF
C8P6	430B6042	C,ELEC 25V 100UF
C8P7	42AA2744	C,CERAMIC 25V 0.1UF
C8P8	42AA2744	C,CERAMIC 25V 0.1UF
C8P9	42AA2744	C,CERAMIC 25V 0.1UF
C8PA	42AG0520	C,CHIP 50V 8200PF
C8PC	42AG0520	C,CHIP 50V 8200PF

SYMBOL	PART NO	DESCRIPTION
C8R1	430B9062	C,ELEC 50V 2.2UF
C8T3	42AA2744	C,CERAMIC 25V 0.1UF
C8T4	430B9064	C,ELEC 50V 4.7UF
C8T5	42AA2744	C,CERAMIC 25V 0.1UF
C8T6	430B9064	C,ELEC 50V 4.7UF
C8UE	42AA2744	C,CERAMIC 25V 0.1UF
C8W1	42CA1416	C,CERAMIC 50V 10PF
C8W2	42CA1416	C,CERAMIC 50V 10PF
C8W6	42AA2744	C,CERAMIC 25V 0.1UF
C8W7	42AA2744	C,CERAMIC 25V 0.1UF
C8W9	430B9028	C,ELEC 16V 47UF
C8WA	430B9065	C,ELEC 50V 10UF
C8X1	42AA2744	C,CERAMIC 25V 0.1UF
C8X2	42AA2744	C,CERAMIC 25V 0.1UF
C901	420C9557	C,CERAMIC 500V 330PF
C902	420C9551	C,CERAMIC 500V 100PF
C903	4204K108	C,CERAMIC 2KV 0.01UF
C904	420D0019	C,CERAMIC 2KV 1000PF
C905	42AA2744	C,CERAMIC 25V 0.1UF
C958	433A4033	C,ELEC 25V 10UF
C959	42AA2726	C,CERAMIC 50V 0.01UF
C983	428D4317	C,METAL FILM 100V 0.22UF
C984	430C6621	C,ELEC 100V 47UF
C985	420C9563	C,CERAMIC 500V 1000PF
C986	430C6582	C,ELEC 50V 10UF
C987	430B9098	C,ELEC 100V 10 UF
C989	423E2111	C,CERAMIC 500V 10PF

PRINTED WIRING BOARDS

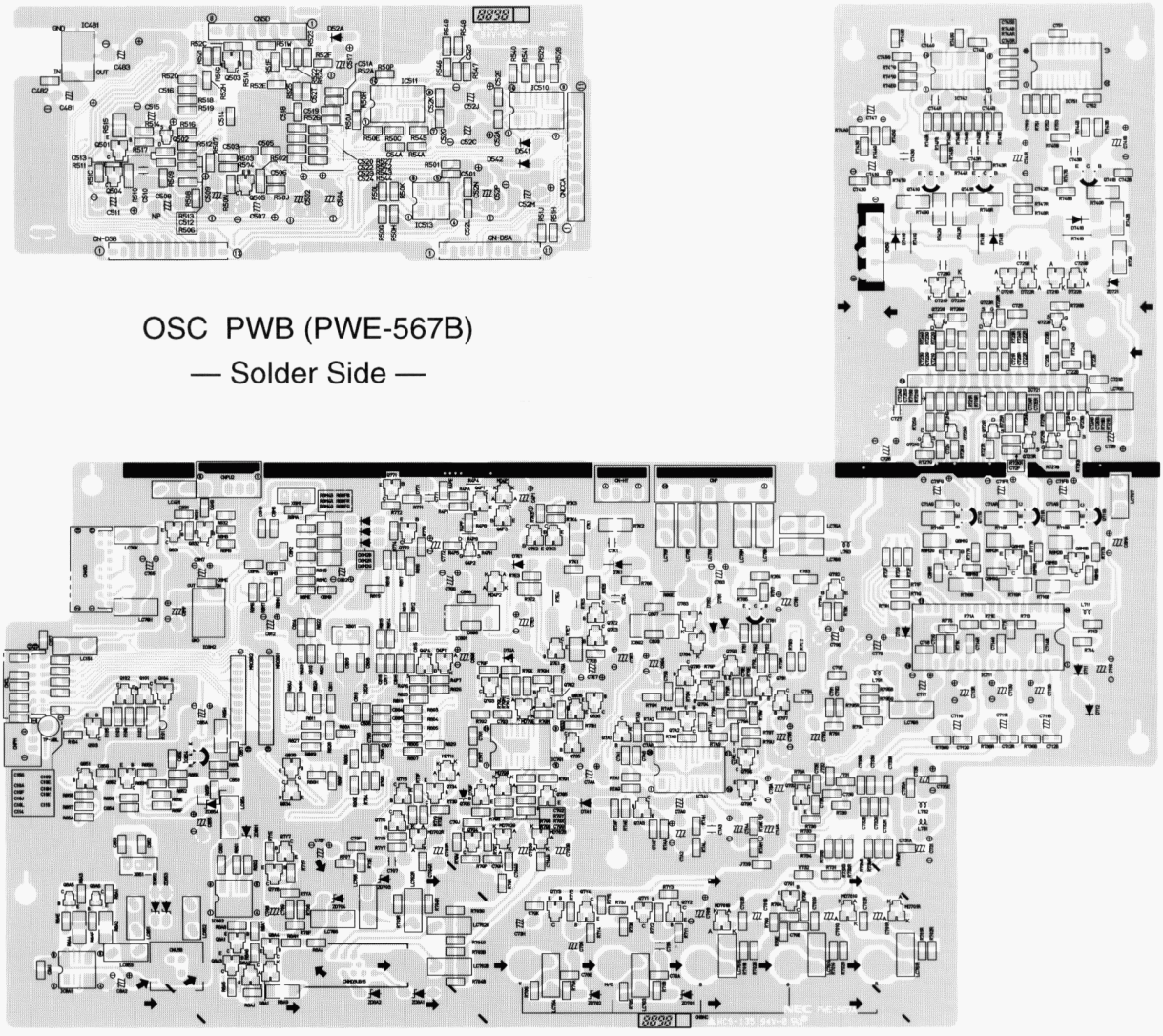


SW/HV PWB (PWE-571)

— Solder Side —

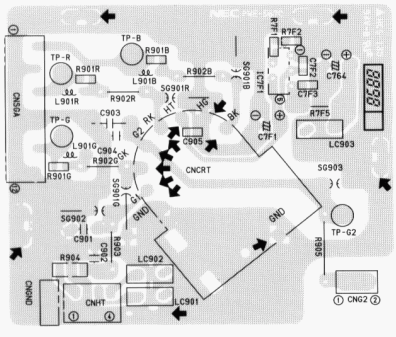
OSC PWB (PWE-567B)

— Solder Side —



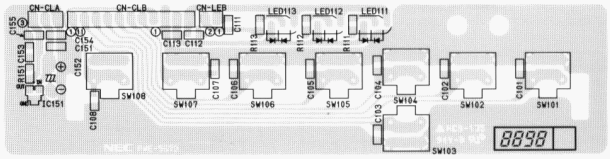
VIDEO PWB (PWE-567A)

— Solder Side —



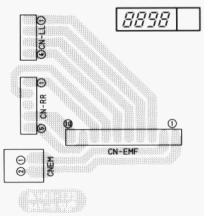
CRT PWB (PWE-567C)

— Solder SIde —



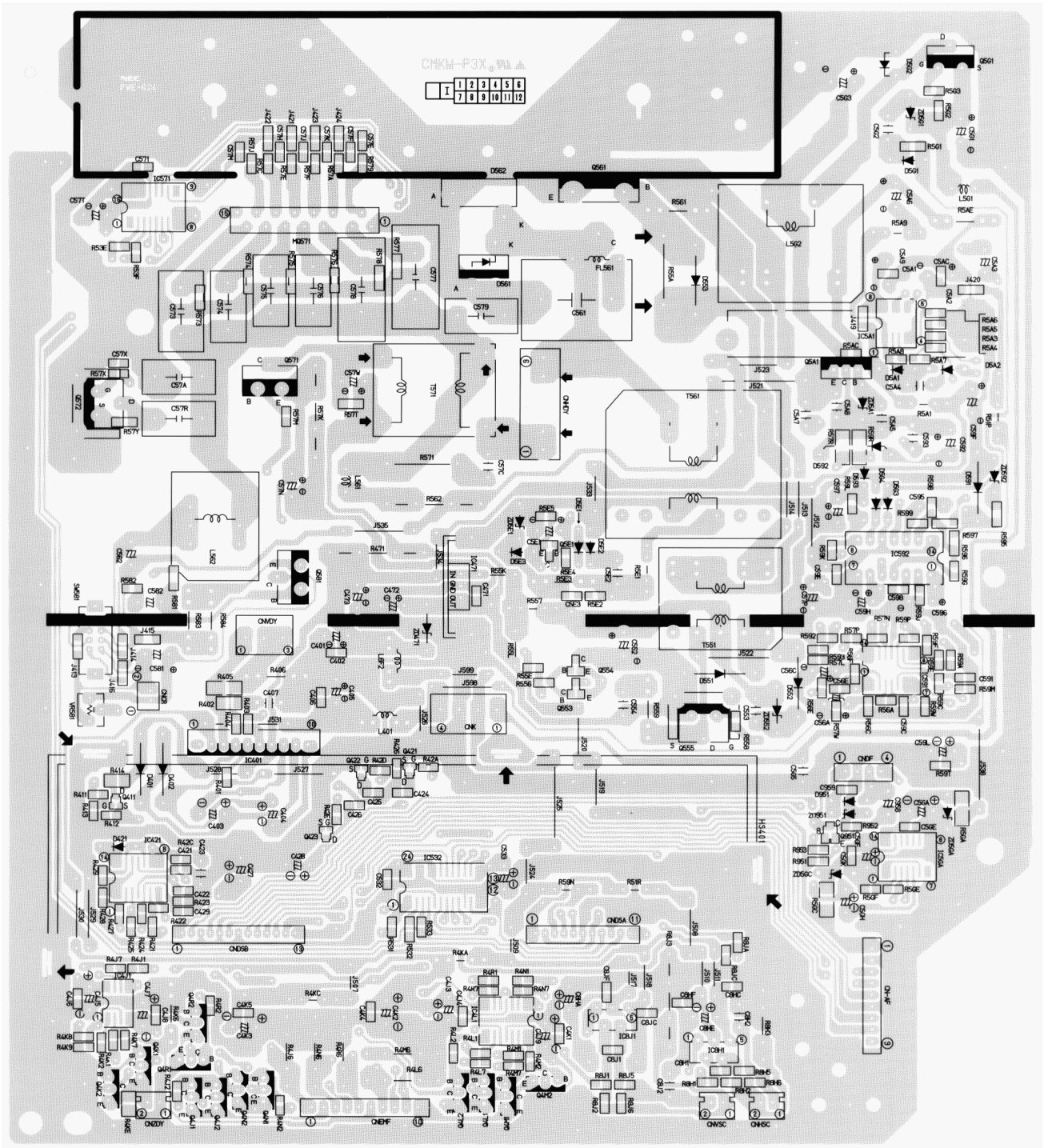
CONTROL PWB (PWE-567D)

— Solder Side —



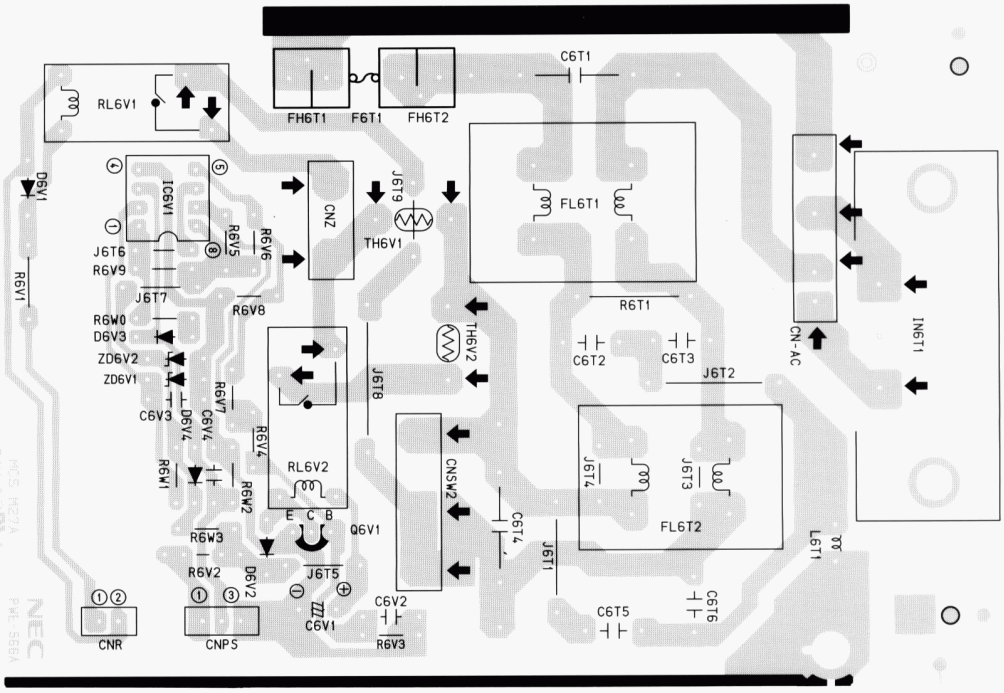
EMF PWB (PWC-567E)

— Solder Side —



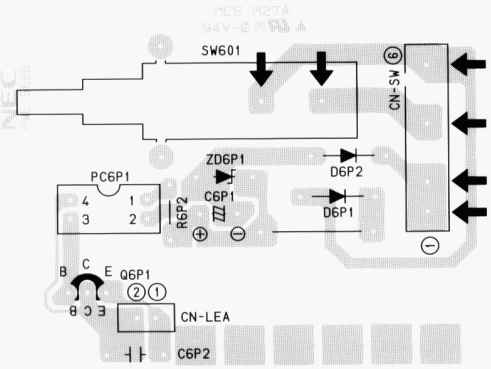
DEF PWB (PWE-624)

— Solder Side —



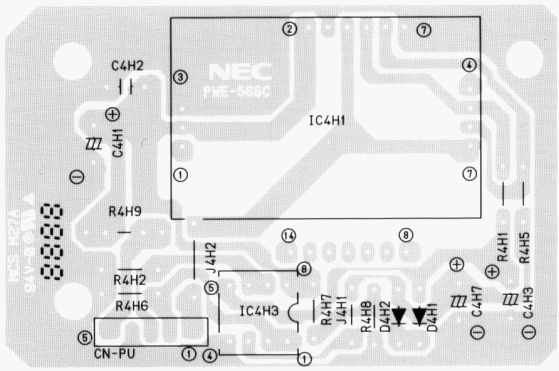
INLET PWB (PWE-566A)

— Solder Side —



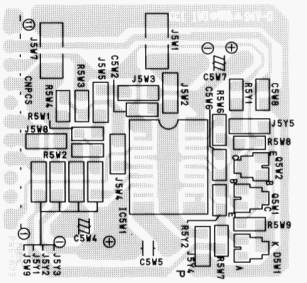
PU PWB (PWE-566C)

— Solder Side —



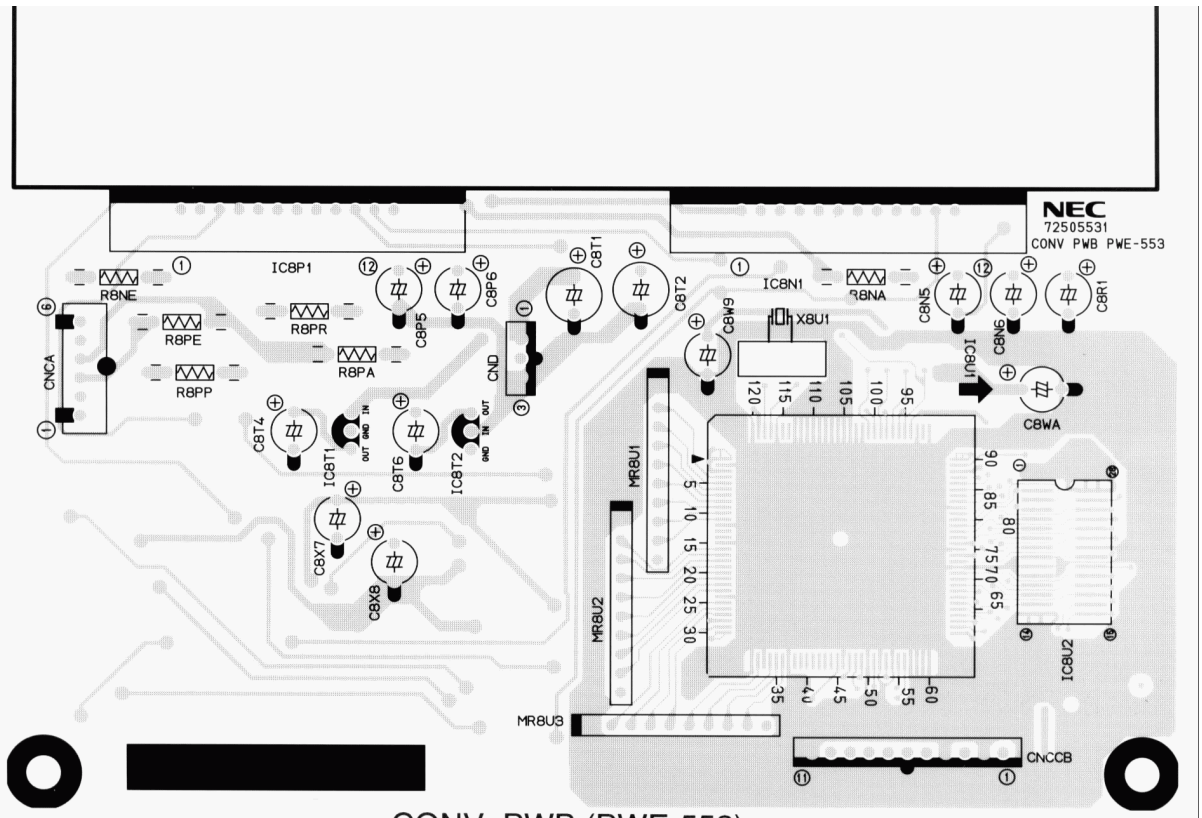
SW PWB (PWE-566B)

— Solder Side —



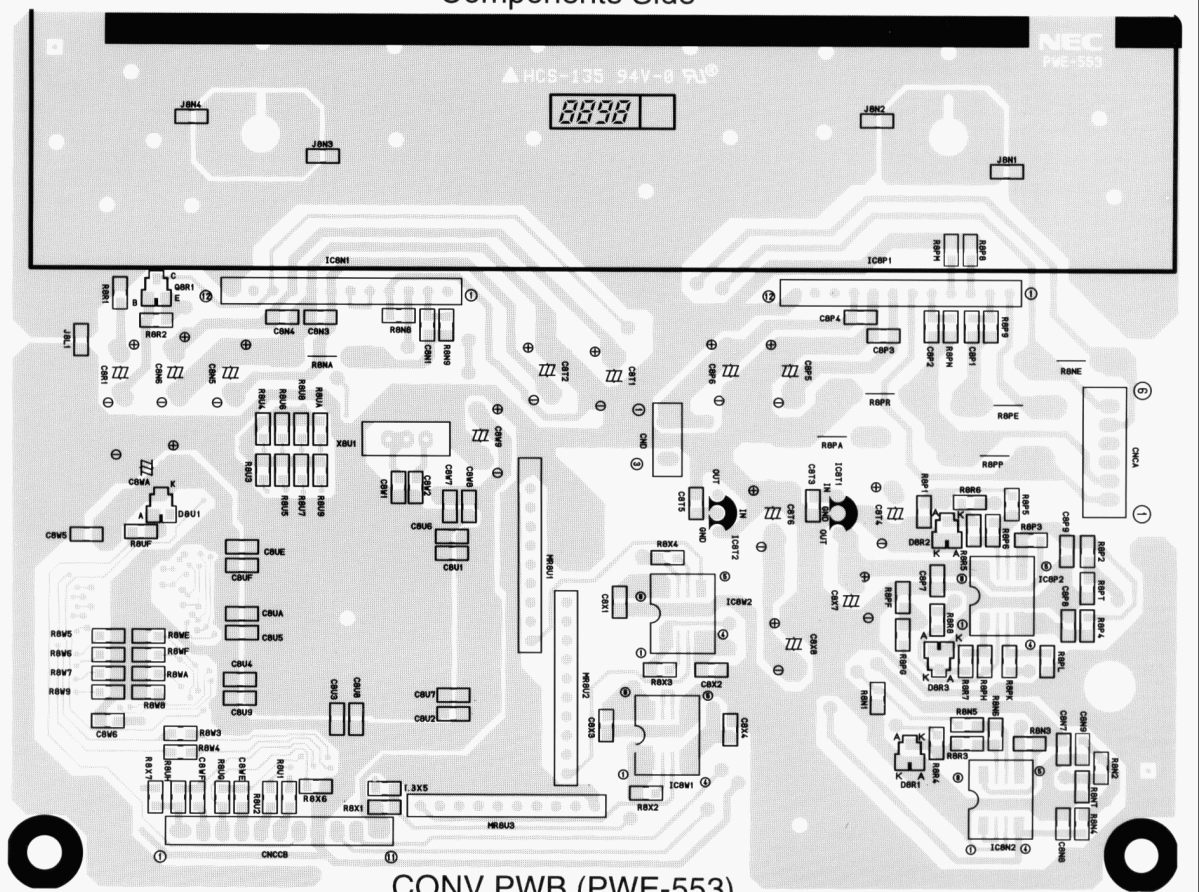
HVCT PWB (PWE-623)

— Solder Side —



CONV PWB (PWE-553)

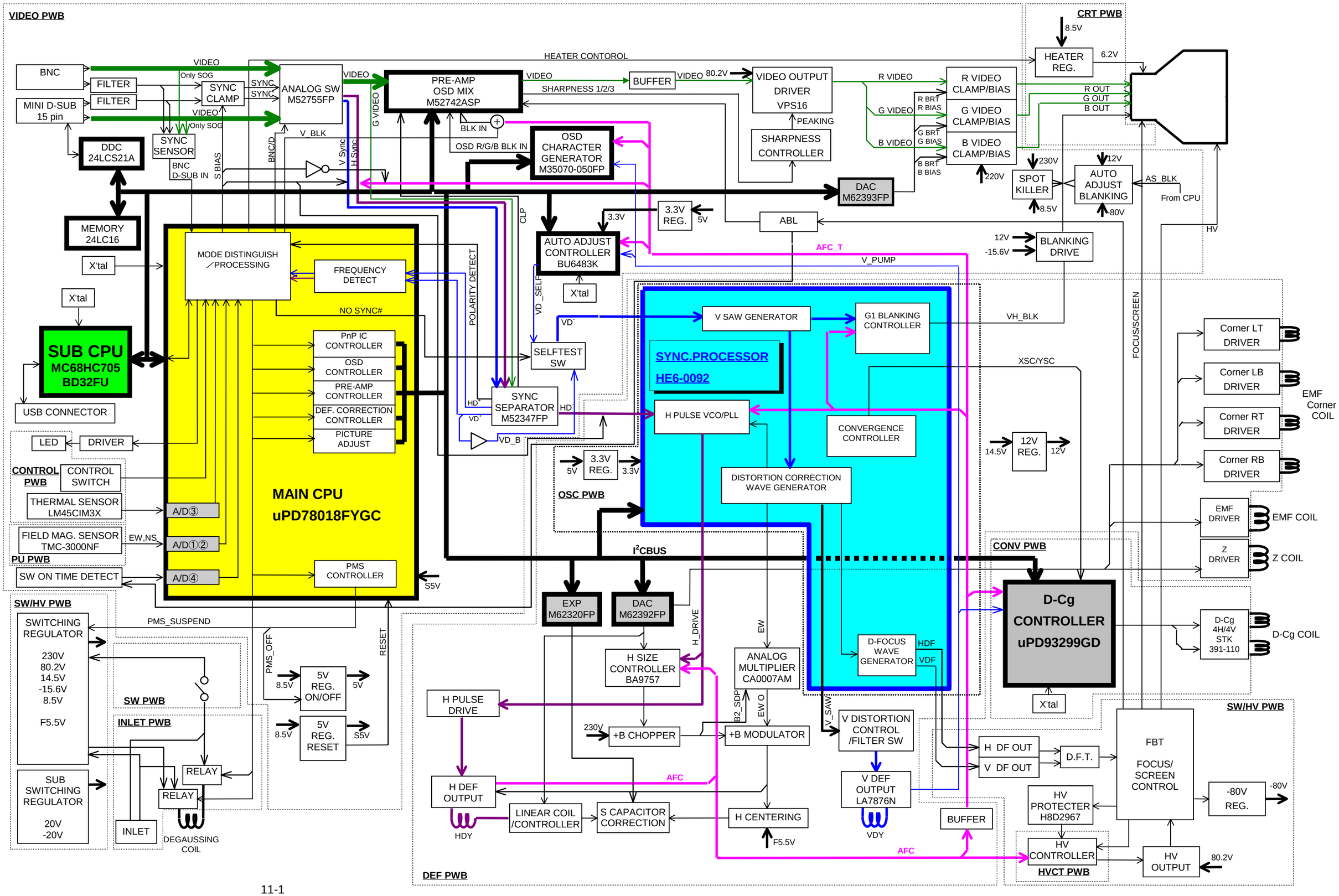
— Components Side —



CONV PWB (PWE-553)

— Solder Side —

MultiSync FP1370 (JC-22W70)BLOCK DAIGRAM



C&C for Human Potential

NEC

PART NO. 599910501

SCHEMATIC DIAGRAMS

COLOR MONITOR **MultiSync® FP1370**

MODELS FP1370 (A) / (B)

NEC Corporation

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⚠ WARNING

The SERVICE PERSONNEL should have the appropriate technical training, knowledge and experience necessary to:

- Be familiar with specialized test equipment, and
- Be careful to follow all safety procedures associated with high voltage CRT circuit designs to minimize danger to themselves and their coworkers.

To avoid electrical shocks, this equipment should be used with an appropriate power code and be connected only to a properly grounded AC outlet.

This equipment utilized a micro-gap power switch. Turn off the set by first pushing the front panel power switch. Next, remove the power cord from the AC outlet.

To prevent fire or shock hazards, do not expose this unit to rain or moisture.

This symbol warns the personnel that un-insulated voltage within the unit may have sufficient magnitude to cause electric shock.

This symbol alerts the personnel that important literature concerning the operation and maintenance of this unit has been included.
Therefore, it should be read carefully in order to avoid any problems.

⚠ PRODUCT SAFETY CAUTION

1. When parts replacement is required for servicing, always use the manufacturer's specified replacement.
2. Comply with all caution and safety-related notes on the product display chassis and picture tube.
3. When replacing the component, always be certain that all the components are put back in the place.
4. When servicing display monitor unit, it is required that the provided lead dress is used in the high voltage circuit area.
5. It is also recommended that shatter proof goggles are worn, when removing installing and handling the picture tube. People not equipped with the proper precautionary measures mentioned should keep the picture tube away from body while handling.
6. As for a connector, pick and extract housing with fingers properly since a disconnection and improper contacts may occur, when wires of the connector are led.
7. Use a proper screwdriver. If you use screwdriver that does not fit, you may damage the screws.
8. X-radiation precaution

   This product contains critical electrical and mechanical parts essential for X-ray protection.

   Normal anode voltage is 27.0 kV at zero beam picture tube current under AC 100-120V/220-240V input, and anode voltage must not exceed the voltages shown below under any operation condition.

   To measure anode voltage set brightness for very dim picture, and use a high impedance volt meter between chassis and anode lead and measure high voltage.

   If high voltage exceeds the specifications on the chassis schematic diagram, take the necessary corrective action.

Table MAXIMUM ANODE VOLTAGE

beam current	at 0 mA	at 0.8 mA	at 1.4 mA
A/B	34.5 kV	32.5 kV	32.3 kV

9. When you degauss the set with an external degaussing coil, you must keep strictly item " ※Notes about degaussing method " of ADJUSTMENT PROCEDURES.

FP1370
SCHEMATIC DIAGRAMS

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DEF PWB SCHEMATIC DIAGRAM 12

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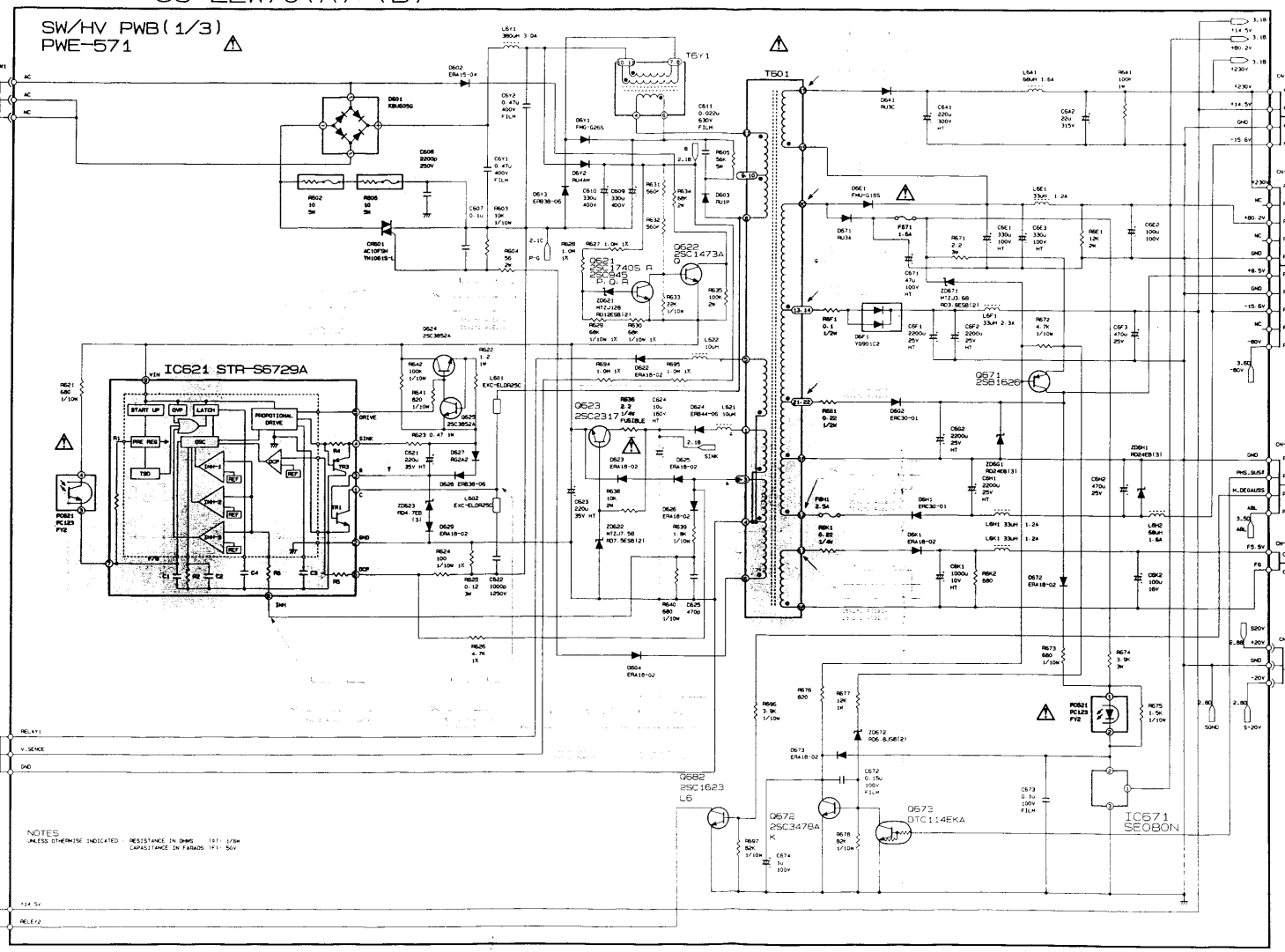
INLET/SW/EMF SCHEMATIC DIAGRAM 16

MODEL Multisync FP1370 JC-22W70(A), (B) SW/HV PWB SCHEMATIC DIAGRAM (1/3)



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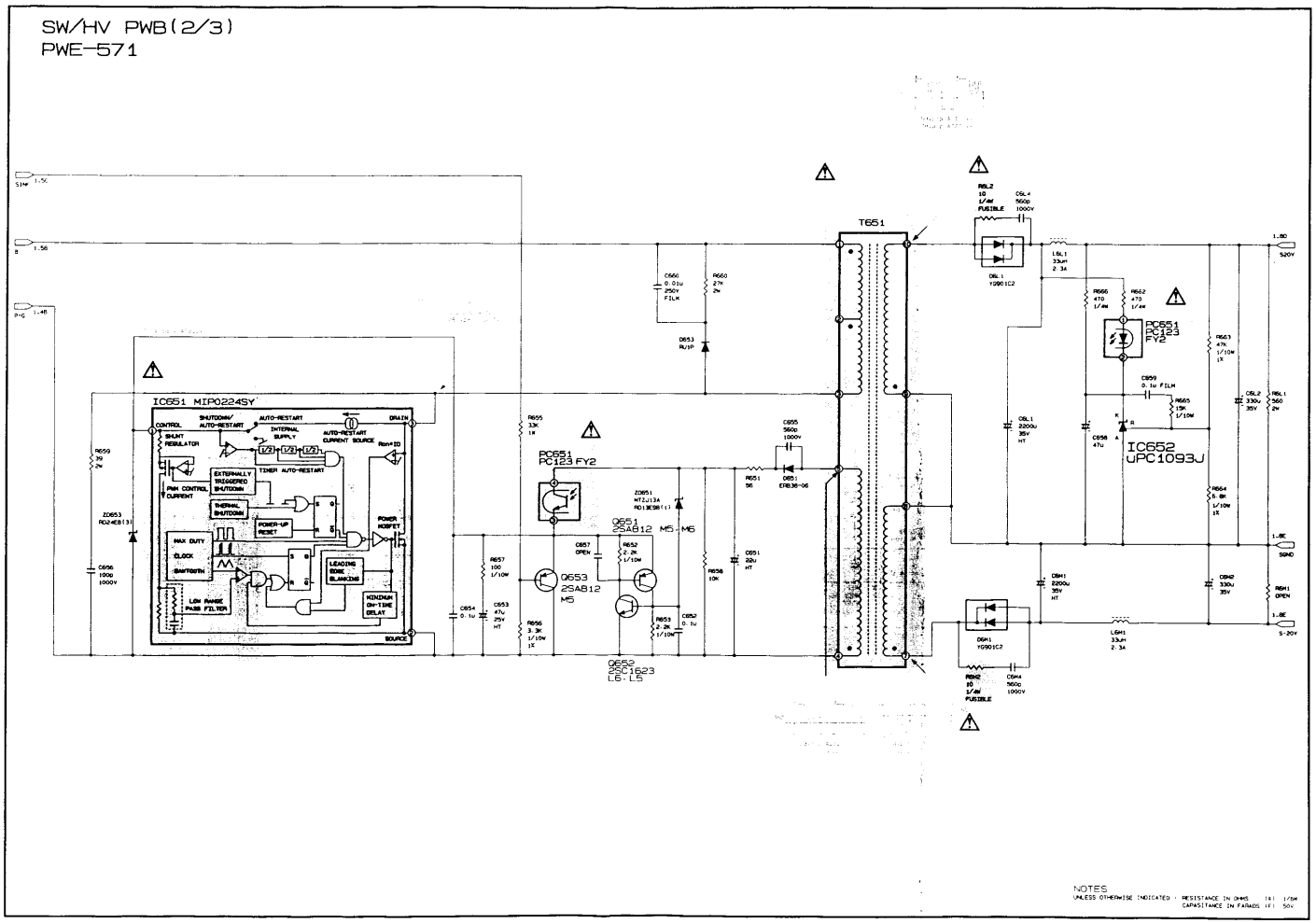
MODEL Multisync FP1370
JC-22W70(A), (B)

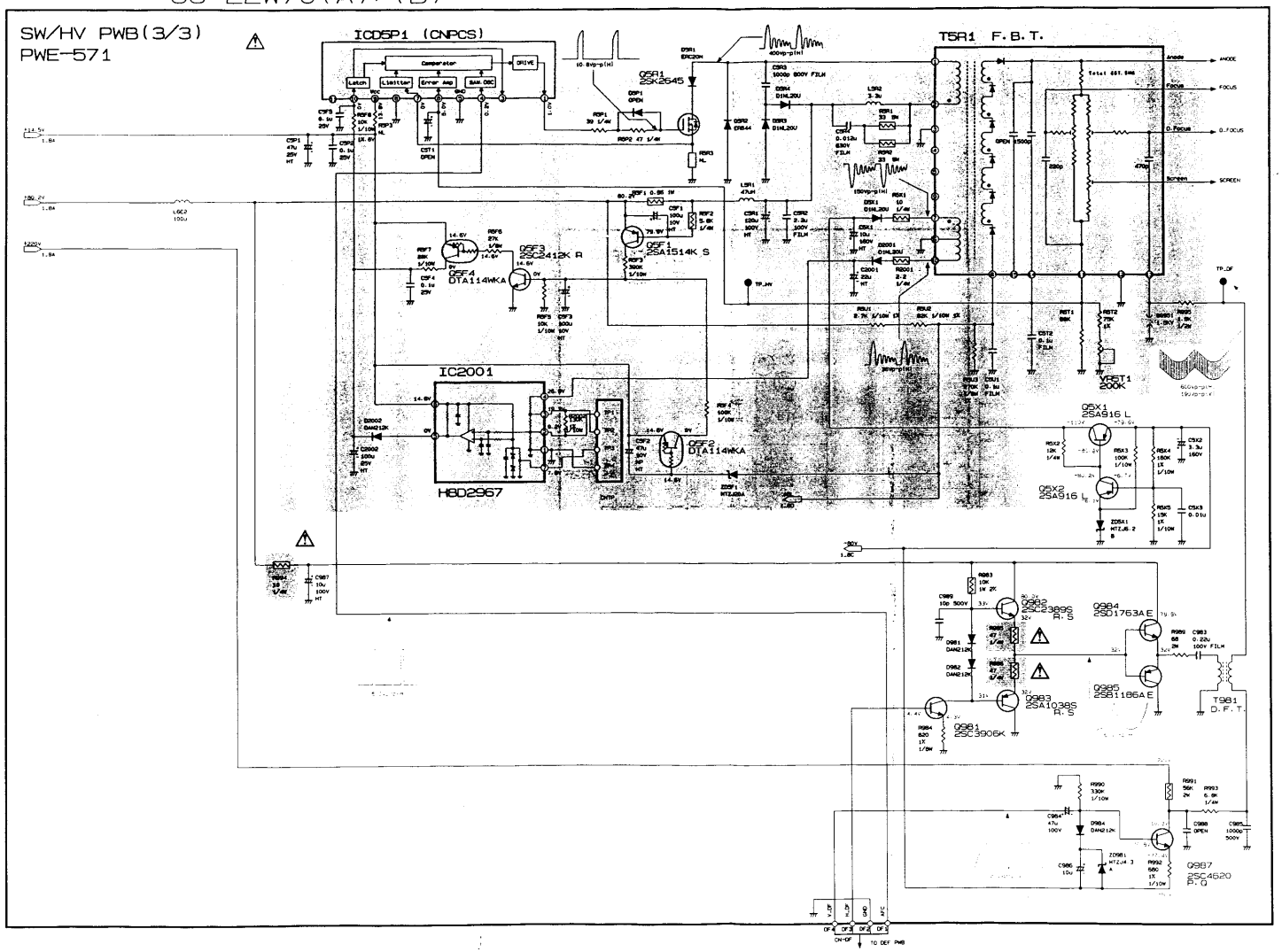
SW/HV PWB SCHEMATIC DIAGRAM (2/3)

SW/HV PWB(2/3)
PWE-571



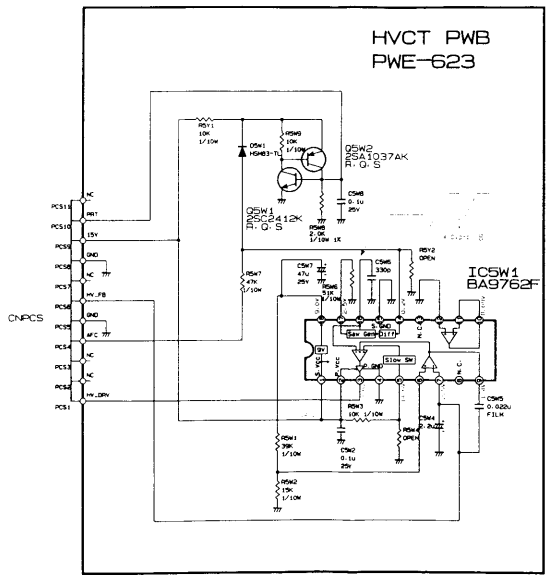
MODEL Multisync FP1370
JC-22W70(A), (B)

SW/HV PWB SCHEMATIC DIAGRAM (3/3)

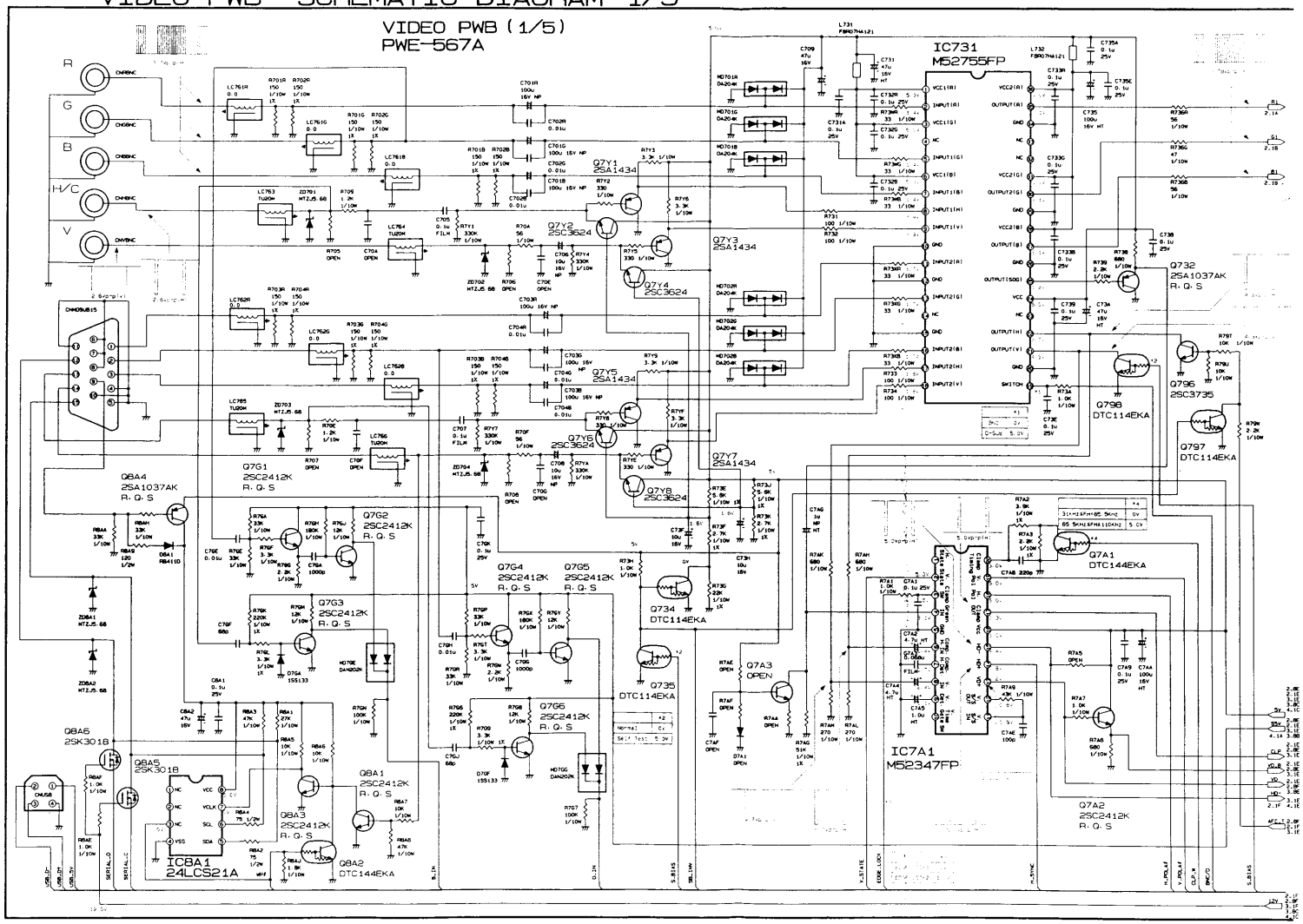


MODEL Multisync FP1370
JC-22W70(A), (B)

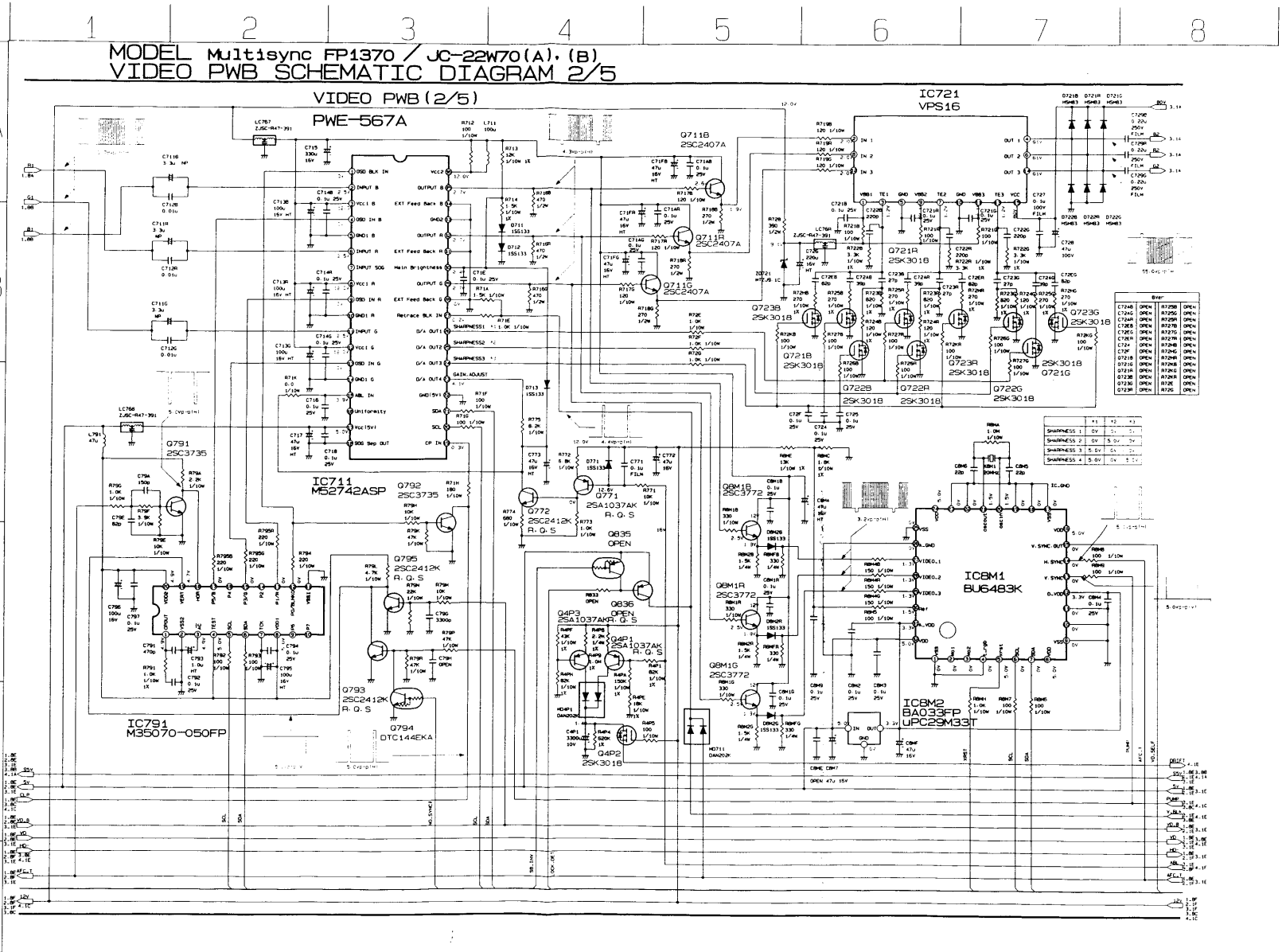
HVCT PWB SCHEMATIC DIAGRAM



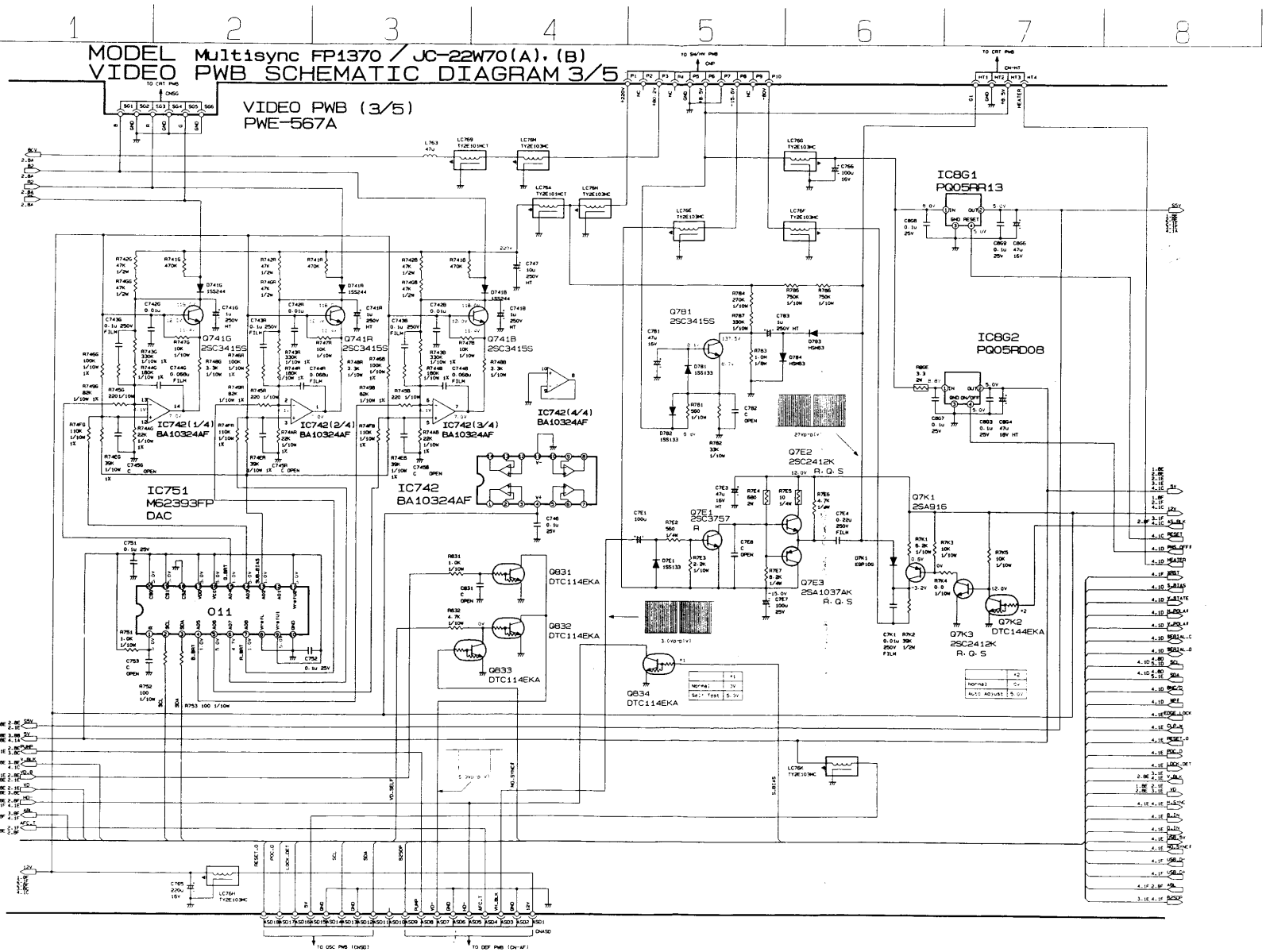
MODEL Multisync FP1370 / JC-22W70(A),(B)
VIDEO PWB SCHEMATIC DIAGRAM 1/5



MODEL Multisync FP1370 / JC-22W70(A),(B)
VIDEO PWB SCHEMATIC DIAGRAM 2/5



MODEL Multisync FP1370 / JC-22W70(A), (B)
VIDEO PWB SCHEMATIC DIAGRAM 3/5



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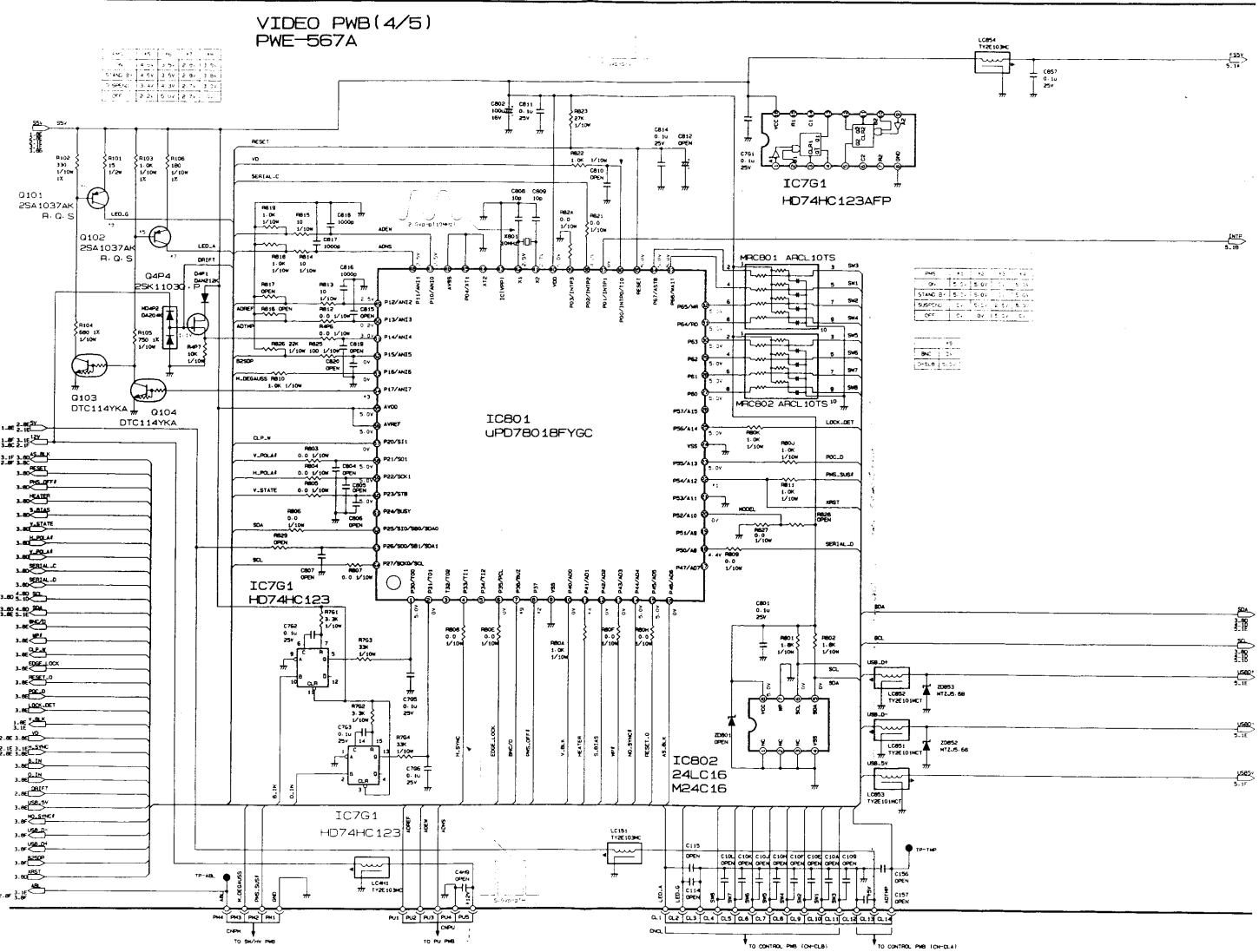
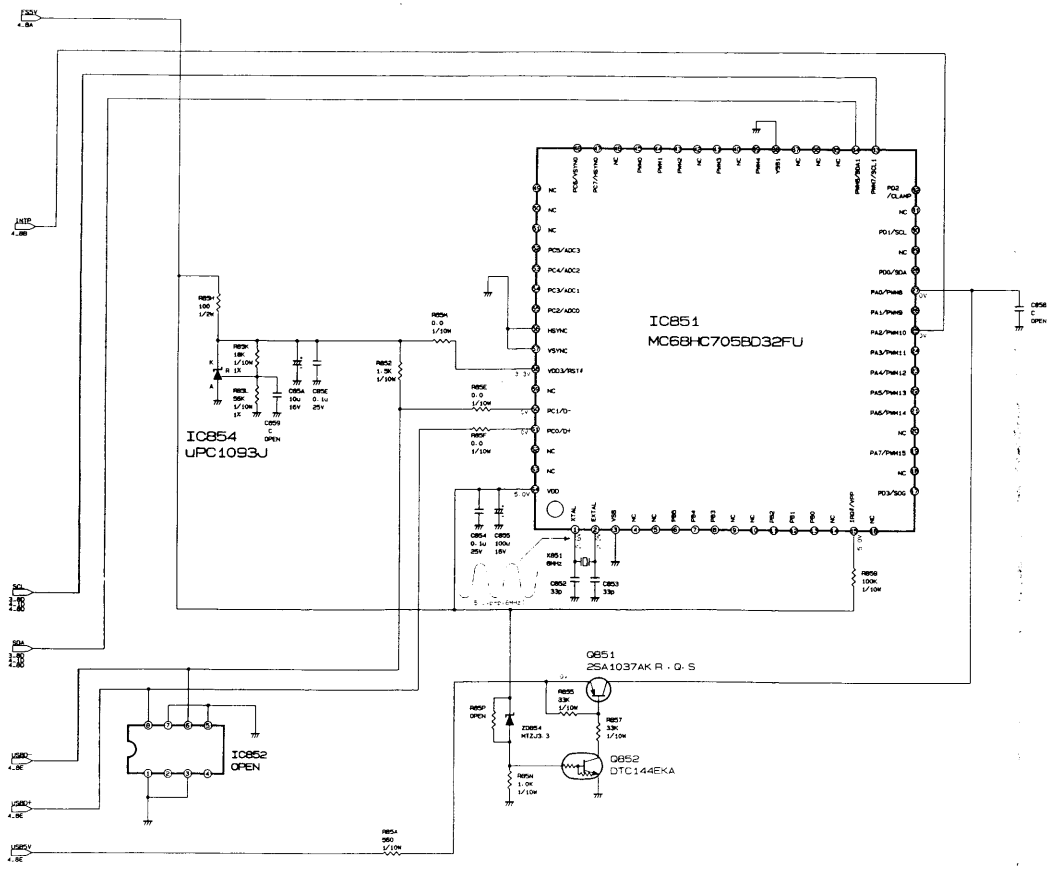
MODEL Multisync FP1370 / JC-22W70(A).(B)
VIDEO PWB SCHEMATIC DIAGRAM 4/5



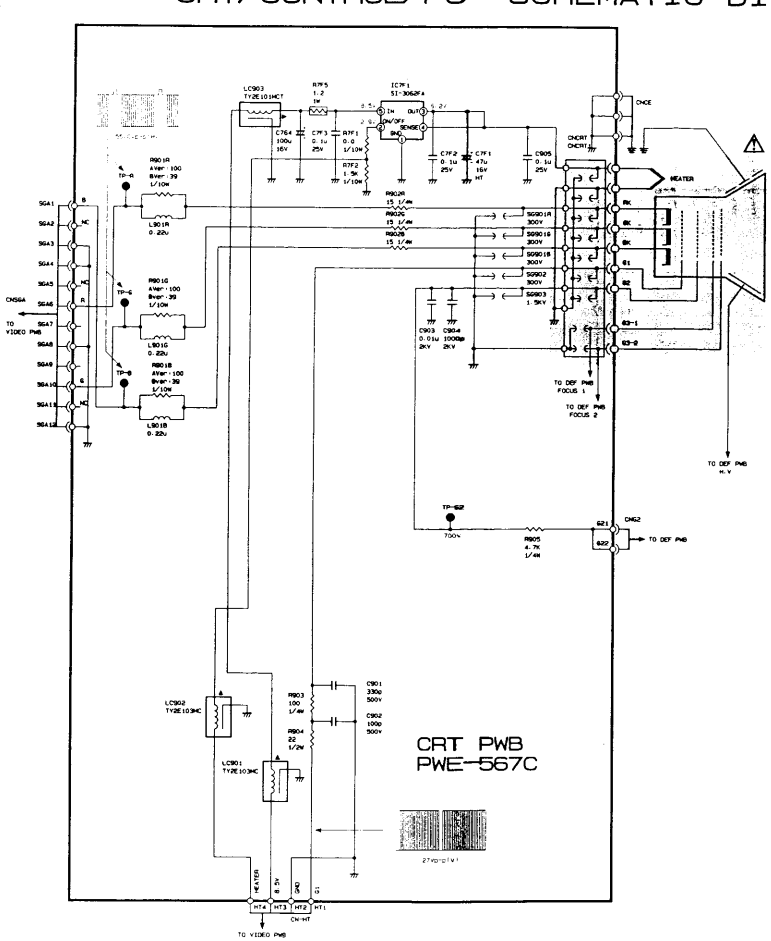
MODEL Multisync FP1370 / JC-22W70(A).(B)
VIDEO PWB SCHEMATIC DIAGRAM 5/5

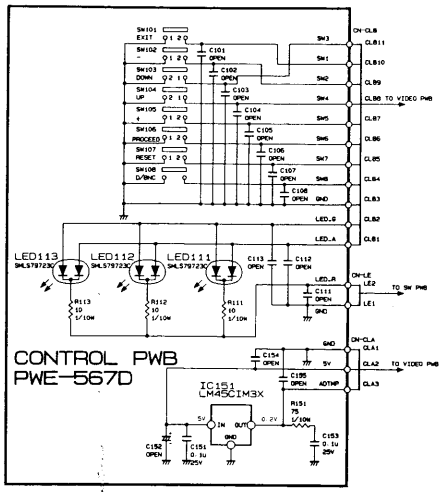
VIDEO PWB(5/5)
PWE-567A

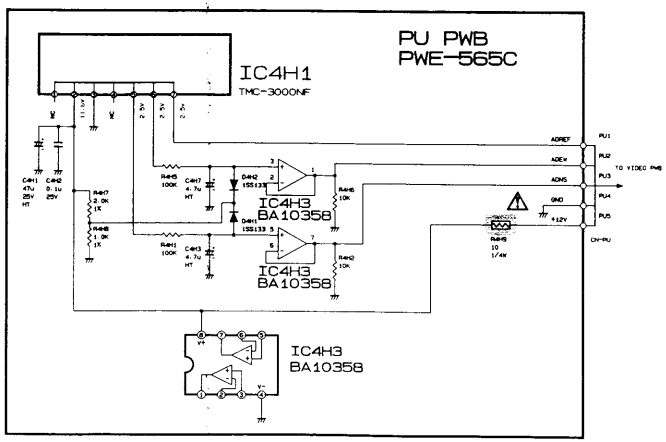


MODEL Multisync FP1370 JC-22W70(A),(B)

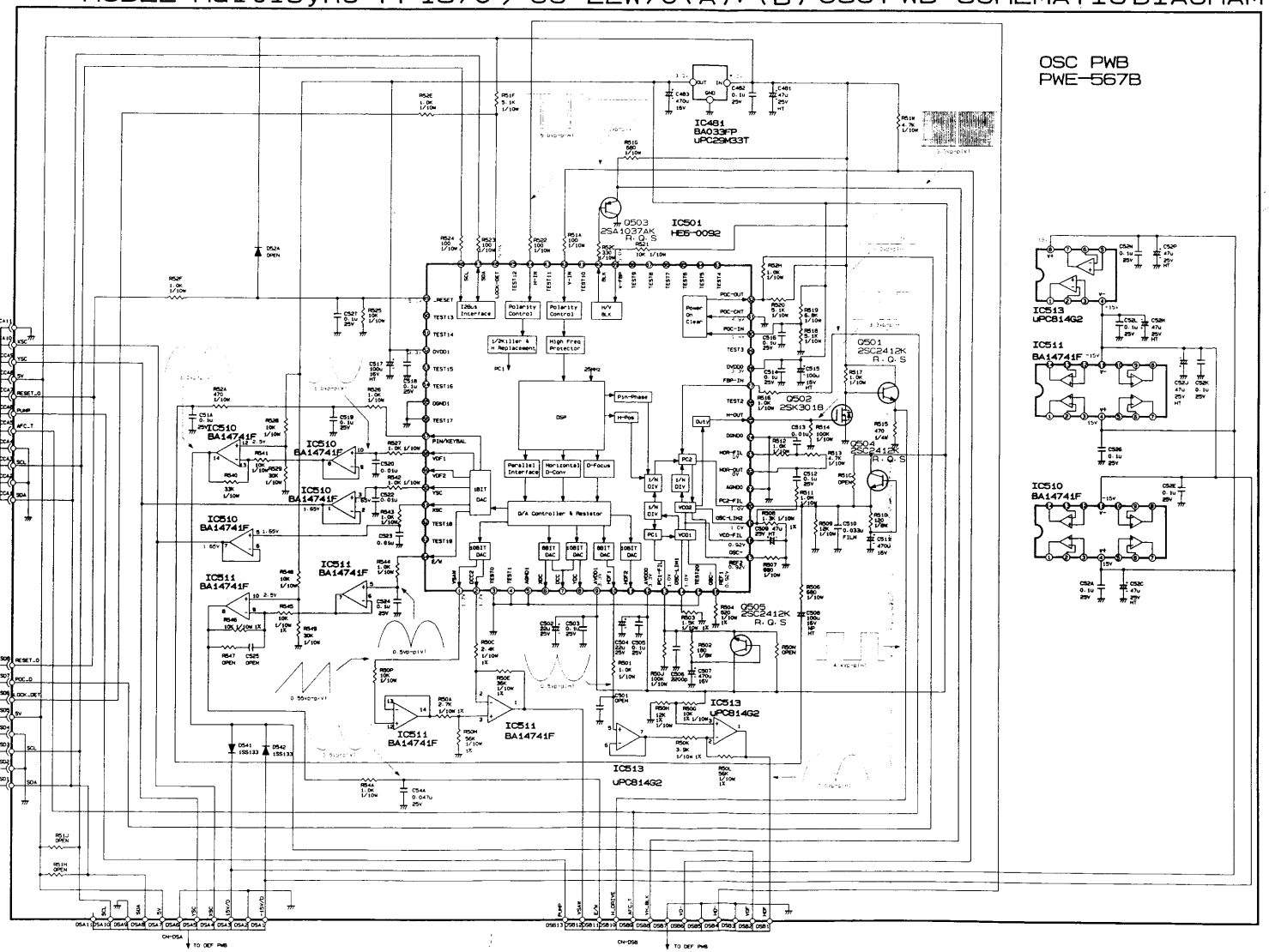
CRT/CONTROL/PU SCHEMATIC DIAGRAM







MODEL Multisync FP1370 / JC-22W70(A), (B) OSC PWB SCHEMATIC DIAGRAM



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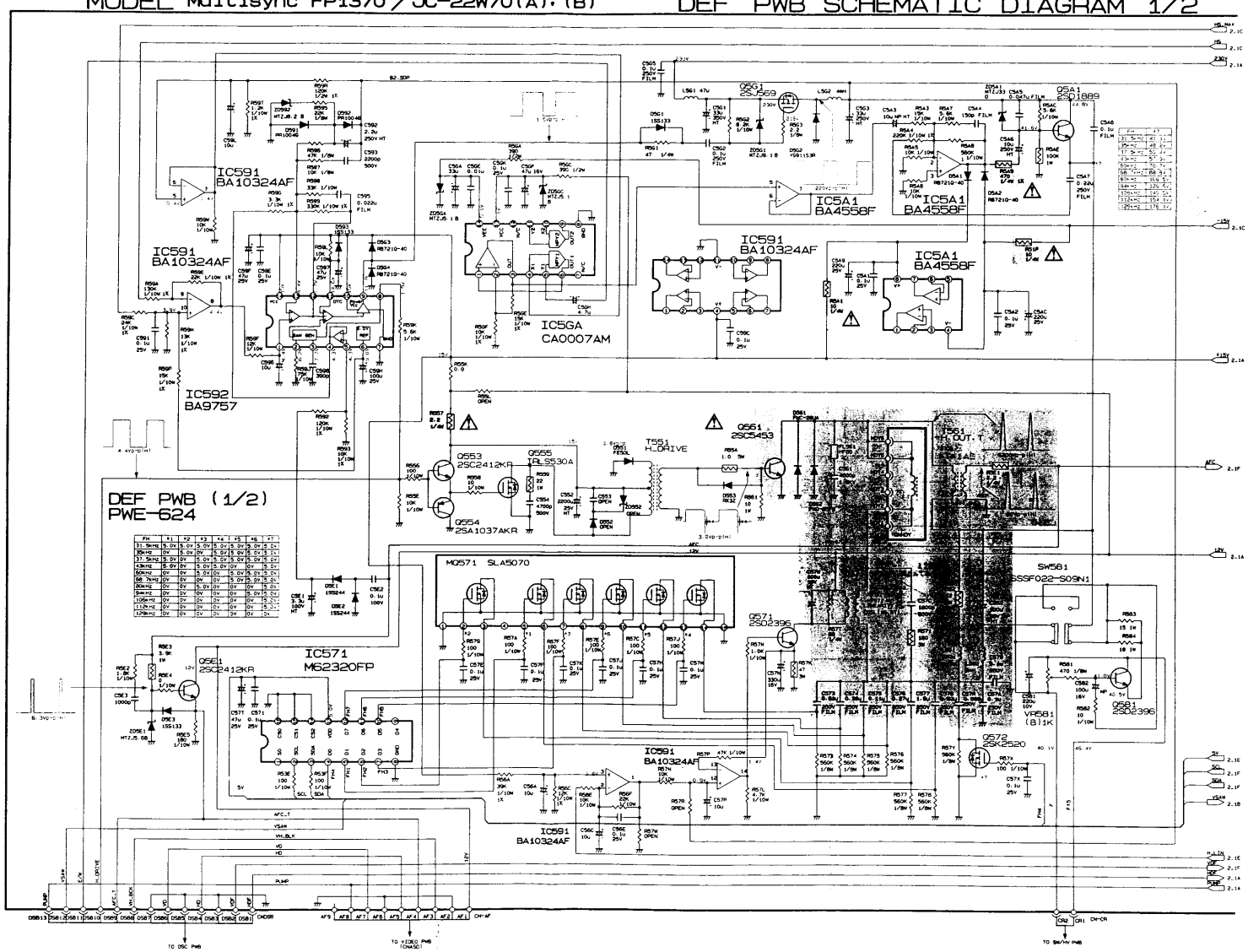
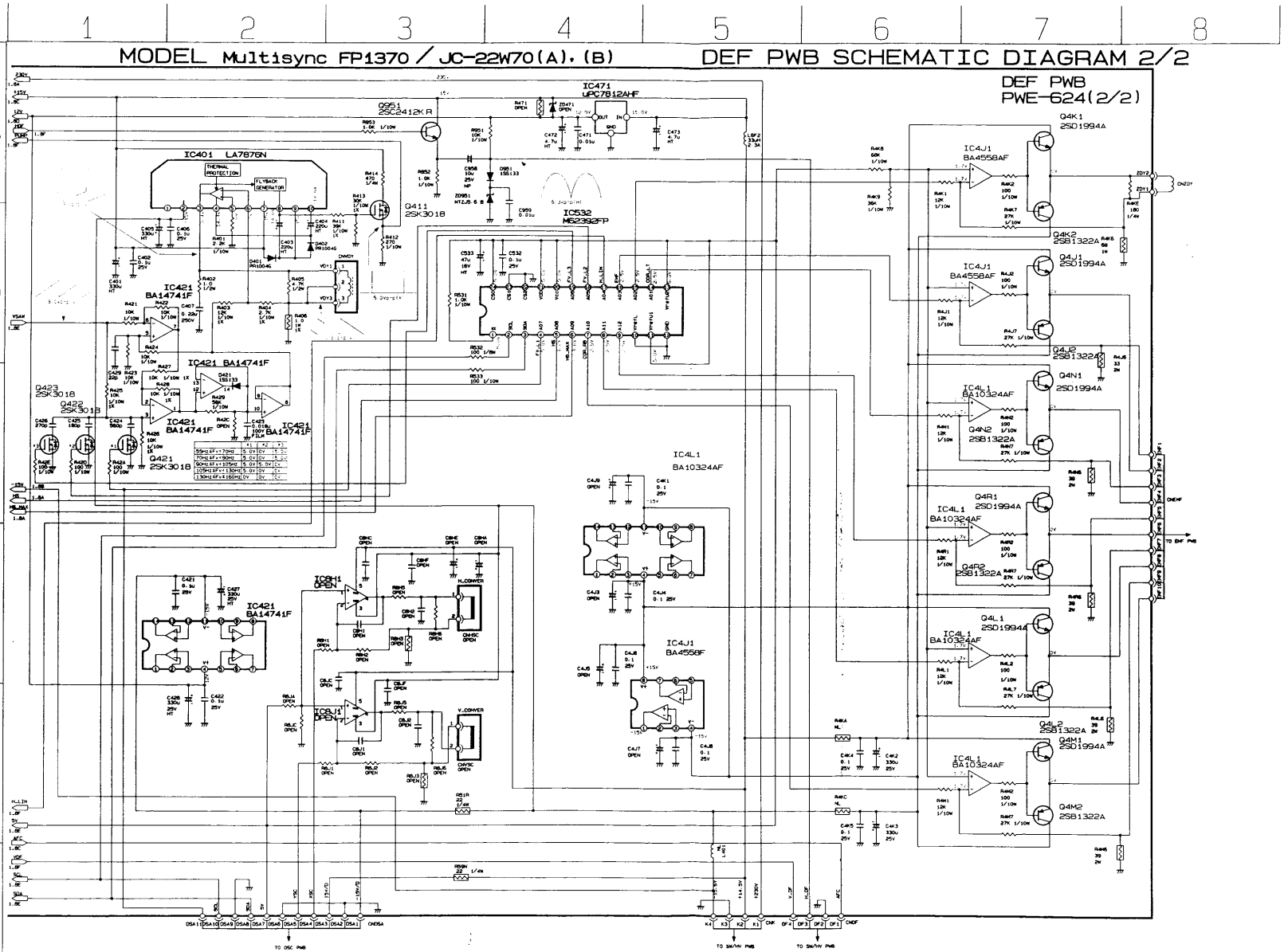
MODEL Multisync FP1370/JC-22W70(A),(B) DEF PWB SCHEMATIC DIAGRAM 1/2

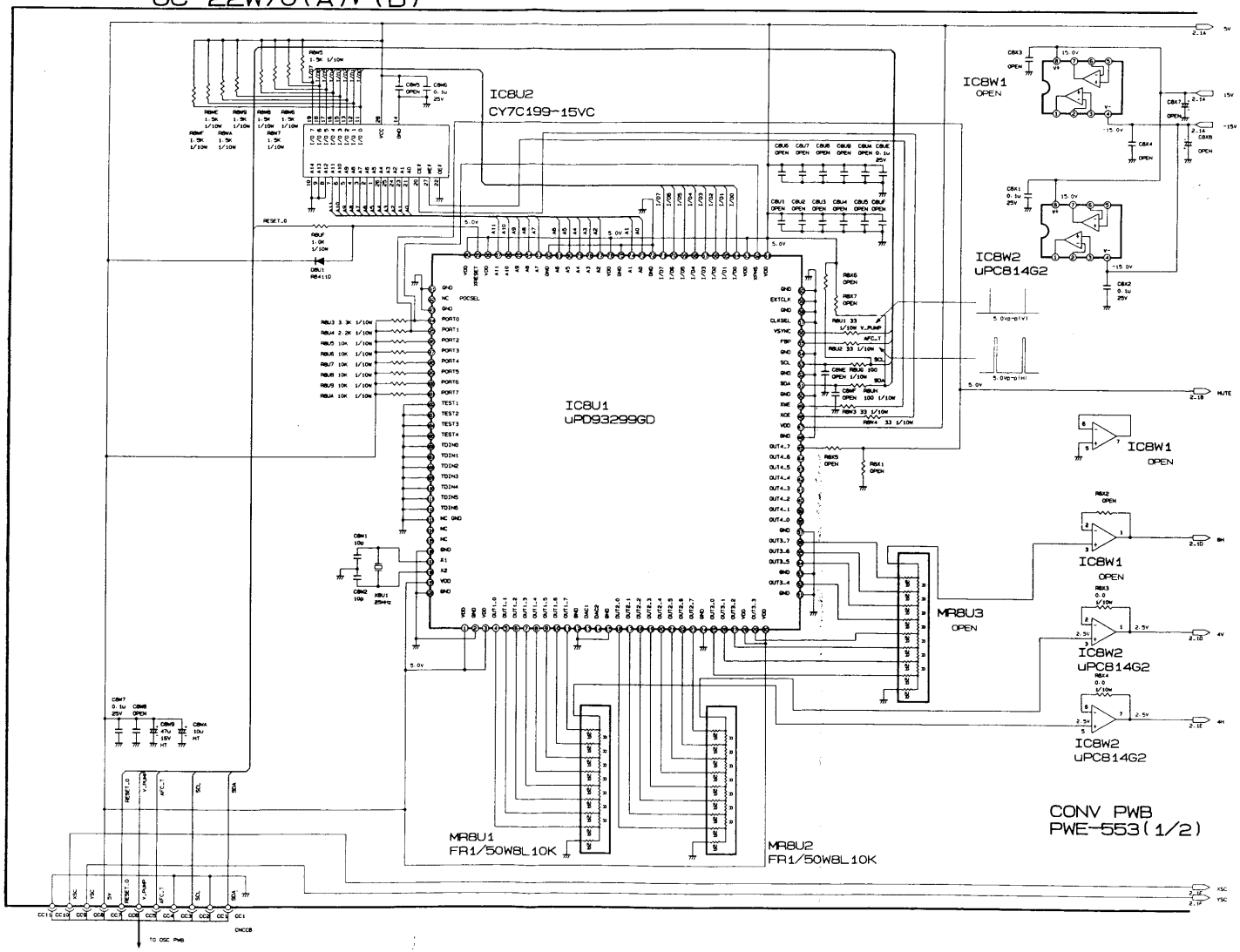


MODEL Multisync FP1370 / JC-22W70(A), (B)　DEF PWB SCHEMATIC DIAGRAM 2/2



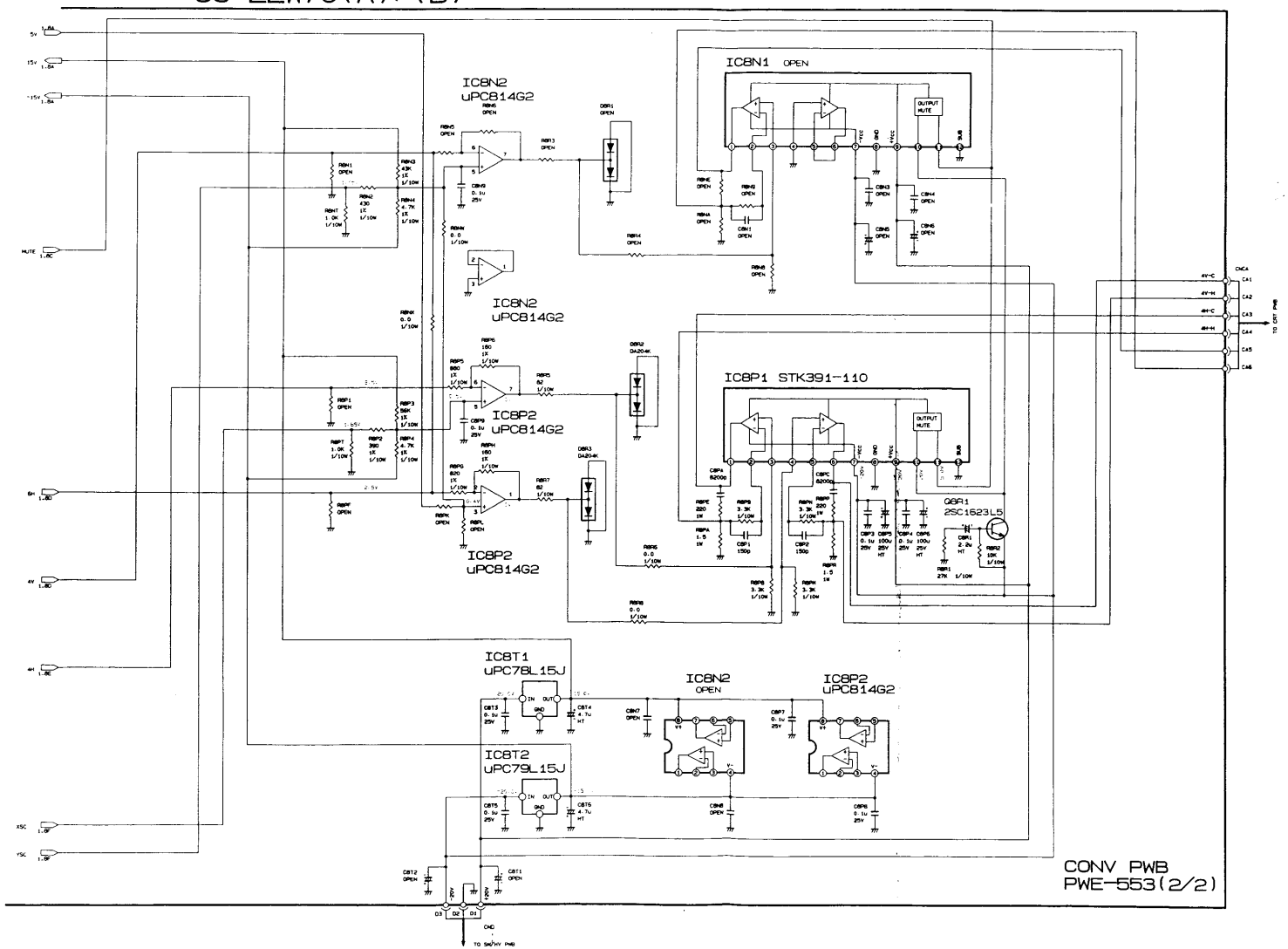
MODEL Multisync FP1370
JC-22W70(A),(B)

CONV PWB SCHEMATIC DIAGRAM 1/2



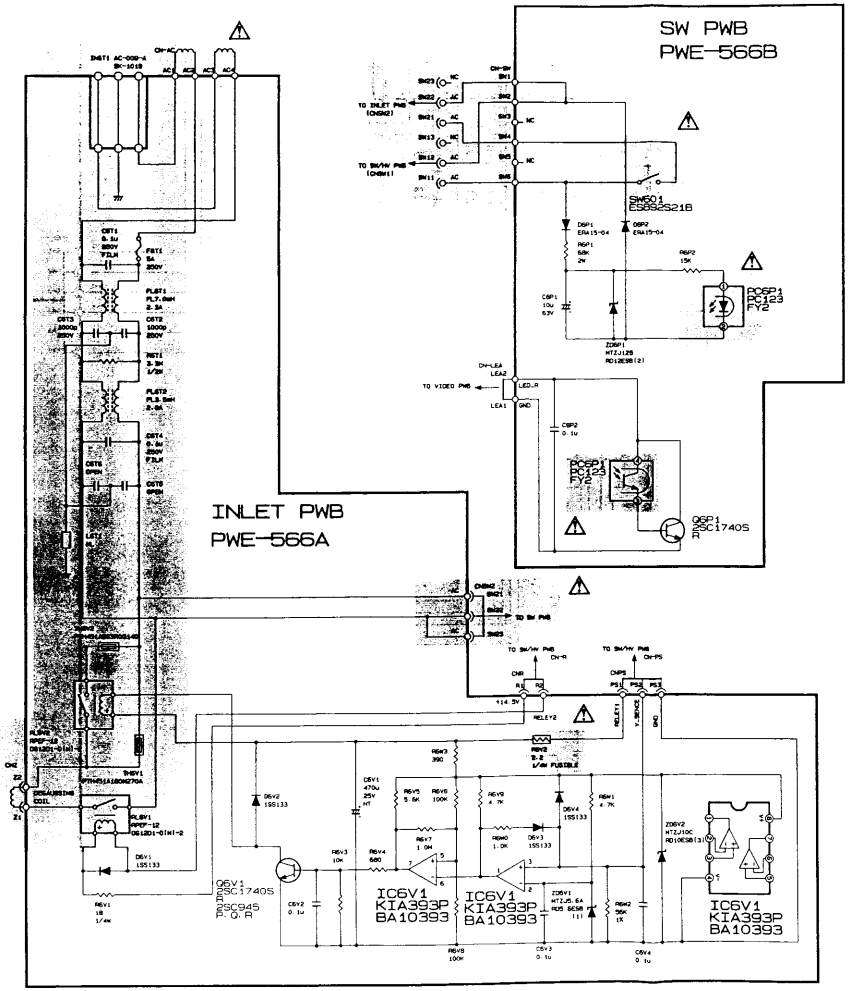
MODEL Multisync FP1370
JC-22W70(A), (B)

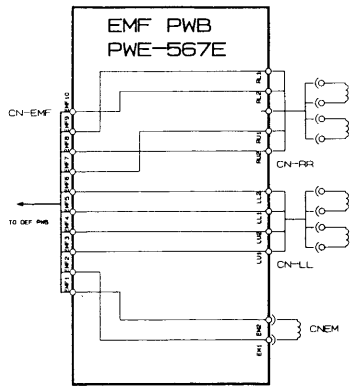
CONV PWB SCHEMATIC DIAGRAM 2/2



MODEL Multisync FP1370
JC-22W70(A), (B)

INLET/SW/EMF PWB SCHEMATIC DIAGRAM





NOTES

1. RESISTOR VALUES ARE IN Ω (OHM). K=1,000 Ω M=1,000,000 Ω
2. ALL RESISTORS ARE 1/6W EXCEPT WHERE OTHERWISE INDECATED.
3. CAPACITOR VALUES ARE IN uF UNLESS OTHERWISE INDECATED. p=pF
4. ALL CAPACITORS ARE 50VOLTS EXCEPT WHERE OTHERWISE INDECATED.
5. VOLTAGES AND WAVEFORMS ARE MEASURED UNDER THE "H" CHARACTER SIGNALS IN THE CONDITIONS OF THE CONTRAST CONTROL IS MAXIMUM. THE BRIGHTNESS CONTROL IS MINIMUM. COLOR CONTROL R/G/B IS MAXIMUM AND ALL OTHER CONTROLS ARE NORMAL OPERATION
   CONDITION OF HORIZONTAL MAGNETIC FIELD IS 0(uT)
6. (H) : HORIZONTAL RATE (V) : VERTICAL RATE
7. VOLTAGES AND WAVEFORMS ARE MEASURED UNDER THE FOLLOWING SYNC AND VIDEO EXCEPT WHERE OTHERWISE INDICATED.
   SYNC : HORIZONTAL RATE 31.5KHz TTL LEVEL NEGATIVE.
   VERTICAL RATE 60HZ TTL LEVEL NEGATIVE.
   VIDEO : ANALOG 0.7Vp-p POSITIVE

WARNING

REPLACEMENT PARTS WHICH HAVE SPECIAL SAFETY.
CHARACTERISTICS ARE IDENTIFIED BY ⚠ SHADING ON THE SCHMATICS.
REPLACE THESE CRITICAL COMPONENTS WITH RECOMMENDED
REPLACEMENT PARTS.
DON'T DEGRADE THE SAFETY OF THE SET THROUGH
IMPROPER SERVICING.
CONTROLS MARKED * IS PERMANENTLY FROZEN.
DO NOT ATTEMPT TO DEFEAT OR IMPROPERLY REPLACE